THE ELECTRICAL WORLD

A Weekly Review of Current Progress in Electricity and its Practical Applications

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Large Dynamo-Electric Machines.

THE EDISON STEAM DYNAMO.

When Mr. Edison attacked the problem of electric lighting, some five years ago, he both felt and expressed the conviction that its economic and practical solution was to be obtained more easily and more satisfactorily by aiming at installations on a large scale for supplying light to large districts. However, this proposition to generate in a central station the current necessary for a large number of lamps and to distribute this to the consumer just as gas and water are supplied, from a system of street mains, was ridiculed by electricians as chimerical, and even speculators on such novel schemes shrugged their shoulders in doubt as if realizing the absurdity of the proposition. The plan of light-restricted areas and buildings separately by means of small isolated plants seemed the most feasible, the most readily adaptable—in a word, the most practical, and was sanctioned by the great majority of electricians and engineers, while it received the immediate encouragement of capitalists. For a long time it seemed that Mr. Edison had made a mistake and made rash promises. The experiments tending toward the realization of the project were numerous, protracted, and many of them unsuccessful. But finally the difficulties were overcome and the long predicted possibility was at last demonstrated.

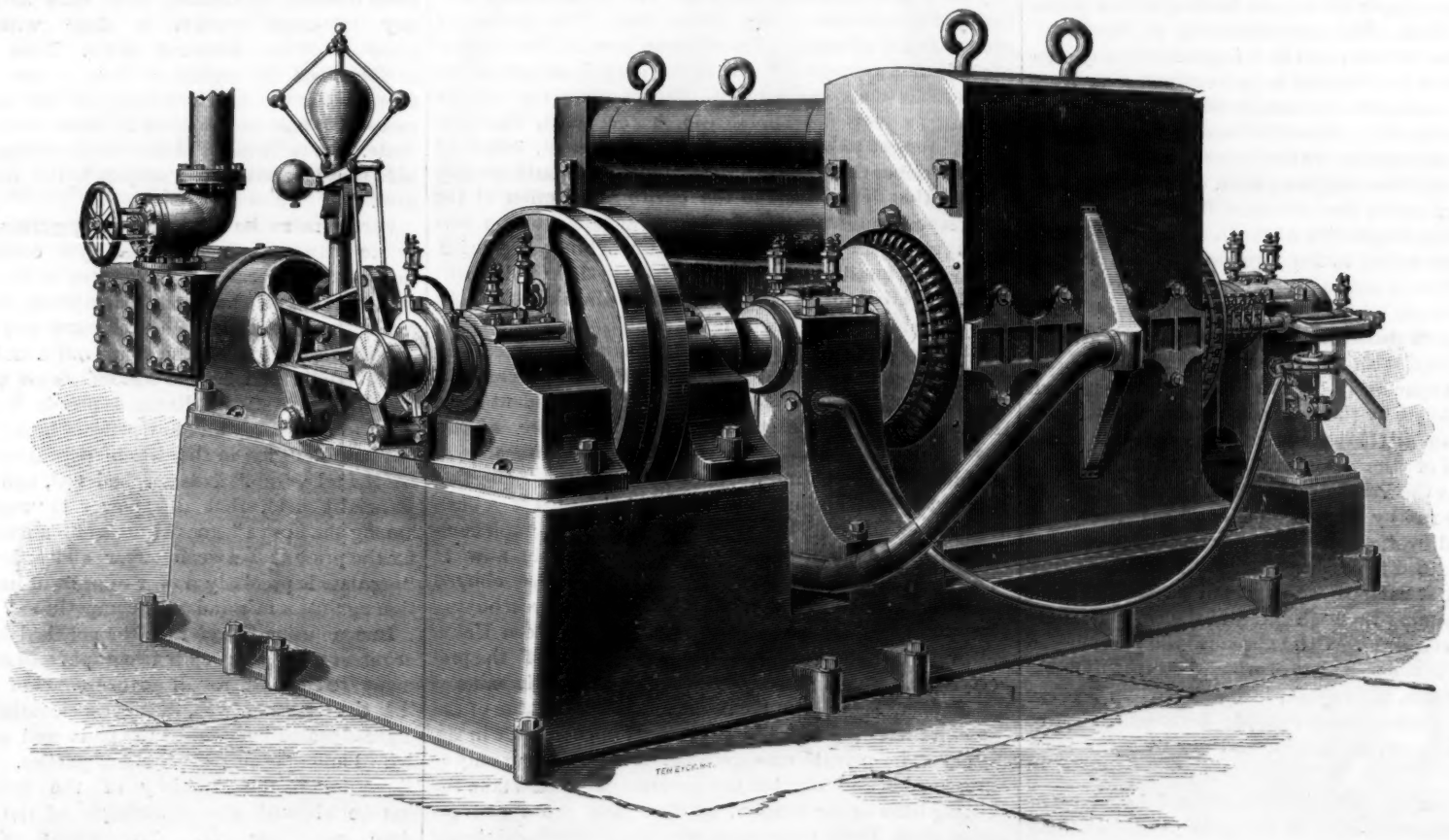
While Mr. Edison was thus engaged in pursuing zealously the task of proving the correctness of his views in that respect, other electricians, his colleagues in the same field, were also experimenting and gathering experience. It was not long before they had learned by actual observation that, as in everything else, the larger the scale on which the operations are conducted, the more economically the results are attained, and they were thus led independently to give their assent to the same conclusion.

It results from all this that the idea of generating electricity on a large scale has been growing into favor among electrical engineers, and has now arrived at the point of being considered the most practicable. The procedure adopted by the various subsidiary and local companies who undertake the lighting and illumination of cities and towns is direct proof of this. But the idea of a large installation entails another consideration, that of the size of the generators. It is necessary to determine whether it is more practical to use a large number of small dynamos or else fewer large ones in an installation of great capacity. The question is easily answered, for there are important reasons which argue in favor of large dynamos. Just as in producing steam power, a single large engine is preferable to a number of small ones, so in this case, the use of large dynamo-electric machines affords greater efficiency and convenience, while the complication and cost are materially reduced. A large dynamo may be belted or even coupled direct to the engine, thus obviating the necessity of countershafting and the multiplication of belting, which are indispensable when small dynamos are used. Moreover, large dynamos not only reduce the space required in a striking manner, but their comparative cost is much less, while their efficiency is much higher. According to the observations and conclusions recently submitted by M. Marcel Deprez and by Prof. Sylvanus P. Thompson, a dynamo electric machine made twice larger in all its linear dimensions will have its power increased in ratio of the fifth power of two, or thirty-two times, while its cost will not be over eight times greater. This means that the machine will absorb and convert thirty-two times more motive power into electrical current, or it will do the work of thirty-two machines having only one half its linear dimensions, while it will occupy only four times the floor space. This conclusion is of course theoretical, and it would be difficult and inconvenient, if not impossible, to realize these results in practice, because certain of the conditions could not be easily complied with; but there is no doubt that it is advantageous, both on the score of cost of construction and electrical efficiency, to make use of large dynamos.

Electrical engineers are now devoting to the construction of large dynamos the serious attention and careful study which the subject deserves.

There is especially considerable activity in this line of invention among English electricians who are trying to vie with Mr. Edison in the construction of large dynamos. Important results have already been attained, and in view of the renewed interest in district lighting awakened in London recently we can doubtless anticipate interesting developments. The large Edison machines which form the prototypes of this gigantic evolution have been described and discussed pretty thoroughly in the electrical journals. However, as there are many of our readers to whom the subject is new, and who are anxious to have a peep at the "mastodon," we present herewith an illustration of one of six dynamos in use at the Pearl street station, with a few descriptive details, reserving a complete description of the station itself for a more favorable occasion.

The dynamo, which resembles in type the smaller Edison machines used for isolated lighting (described in THE ELECTRICAL WORLD, Sept. 1), rests upon a huge sole plate or base-piece of cast iron occupying a floor space of $12\frac{1}{2} \times 8\frac{1}{4}$ ft. This forms the foundation for the pillow blocks on which are the armature bearings, and it also constitutes the bed of the steam-engine, which is connected directly to the shaft of the armature, as shown in the figure. This sole plate with the pillow blocks weighs about 9,600 pounds.



LARGE EDISON STEAM DYNAMO-ELECTRIC MACHINE.

The field magnet cores, which are placed horizontally, are 8 ft. in length. The field pieces are wide enough to receive four cores. Two rows or eight such cores connect the upper pole piece to the back piece, and one row or four connect the lower pole piece. The total weight of the magnet and pole pieces is 24,500 pounds. The cores are wound with large wire. The total resistance of the field as connected is only about $2\frac{1}{4}$ ohms. The field is made to form a shunt to the external circuit, so that the arrangement is what is technically termed "shunt wound." The armature is five feet long and 28 inches in diameter. It is of the same general type as in the smaller machines. The core is made of a wooden cylinder, on which are slipped discs of thin sheet iron separated from each other by tissue paper discs. Eight of the discs are made thicker than the rest and are placed at equal distances from each other. These give solidity to the core, which is fastened by eight transverse bolts passing through all the discs and tightened firmly at each end. Instead of copper wire, copper bars are used for the armature "windings." These are 98 in

number and four sided in section, with the inner side narrowed so as to permit their closer apposition. Their width on the outside surface is about 1 inch and their thickness about ½ inch. By way of insulation, they are wrapped with strips of prepared paper, the layers of which are coated with insulating material. The bars are disposed in two layers on the surface of the armature core. The contiguous rods are separated at intervals by pieces of vulcanized fibre covered with mica. This being an armature of the general "Alteneck" type, the bars require to be prolonged across at the ends of the armature to connect with those on the opposite side. This is done by means of insulated copper discs, which are of slightly greater diameter than the armature core. It is evident that, by connecting the two bars to the same disc, the result is the same as if the bar itself were bent over and braced with the other. This arrangement simplifies very much the construction of the armature, and facilitates the repairing of damages to any section of the armature. Each copper bar may be removed independently and exchanged. All that is necessary is to unscrew it from the lugs of the discs to which it is fastened. The connection of the armature bars with the commutator is secured by means of radial bars projecting from the commutator segments. In order to give the reader an idea of the immense size of this armature, we will state that the copper used in the bars, discs and commutator segments of each armature weighs 3,600 pounds. The total weight of the armature, including shaft and core, is 8,500 pounds. The resistance of each bar is around $\frac{1}{30000}$ ohm, and the total resistance of the armature from brush-holder to brush-holder is less than $\frac{1}{300}$ ohm, so that the field magnets, although forming a circuit of low resistance, constitute a shunt of high resistance, as compared with the resistance of the armature. There are five brushes touching the commutator on each side, each brush being carried by a separate holder, pivoted on a horizontal arm, which supports the whole five. The arrangement is literally the division of what would otherwise be a wide brush-holder into five smaller ones, so that each brush can be attended to by itself without giving rise to any interruption. The two arms which support the brush-holders are attached to a lever moving on the centre of rotation of the armature, so that the "lead" of the brushes can be readily adjusted. These arms are of copper, and the large copper conductors leading to the mains are attached to them. The current passing in the armature bars gives rise to heat, and as it is desirable to eliminate this heat as fast as produced to prevent undue increase in the armature resistance, the armature is kept constantly under the influence of a current of cool air. The air is forced by a fan into a tube, which delivers it to the armature at the centre of the magnetic field, where it divides to pass out at either end of the armature into the open air, and to serve for the ventilation of the room.

The engine represented in the figure is of the Porter-Allen type. The crank rod is connected to the shaft by means of a crank pin which joins together the two balance discs shown in the figure. The engine has 11 × 16 cylinder, is supplied with automatic cut-off and can therefore be worked expansively. The Porter governor is used. The power developed by the engine is around 150 horse-power, with steam at 115 lbs. and cutting off at quarter stroke, the speed of the armature being 350 revolutions per minute. At the Pearl street station only three of the six dynamos are run by Porter-Allen engines; the other three are worked by Armington & Sims engines.

The speed obtained is very regular, the heavy armature playing the part of balance wheel in an admirable manner. Notwithstanding the high speed of the engines, there is scarcely any vibration. This is because the parts are so solidly fastened to the sole plate of which both the dynamo and the engine form, so to speak, intimate portions. There is no yield or displacement possible between the two, hence the smoothness of motion and its freedom from jars.

The gap between the pole pieces is covered by plates of brass which are firmly bolted to the pole pieces, whereby the upper pole piece is supported and solidly maintained at the proper distance from the lower one, while relative motion between the two is prevented. The large Edison dynamos are intended to supply enough current for 24,000 lights of 8 candles or 12,000 of 16 candles.

The supply of current adapts itself to the use made of it by those supplied with the Edison light, the regulation being accomplished by a variation of the resistance introduced into the field-magnet circuit. The large dynamos are all connected in multiple circuit to the mains, and they are all kept at a uniform electromotive force near the standard adopted (110 volts), the regulation being effected simultaneously in all. It is the intention to keep only a part of the dynamos running, one or two being kept in readiness to serve as relays in case of accident to any of the others. At present, however, the demand on the system by consumers is so great that at dusk it is necessary to keep five dynamos in operation. It is estimated that at this time there are over 5,500 of the lights being used in the district. The present capacity of the station is, therefore, well taxed, and the company is unable to satisfy the demands of new applicants for the light until the new dynamos have been put in operation, which will probably be within a couple of months.

A Government Telegraph.

The proposition to establish a government telegraph is meeting with considerable discussion and is viewed in about as many ways as there are parties to the discussion. Mr. Gould's proposition, or what was considered by the general public as his proposition, to sell the Western Union lines to the government for eighty millions, has been regarded in some quarters with so much opposition that a suggestion has been urged for the government to construct new lines, and, by maintaining a ruinous competition with existing lines, destroy the property. The Chicago *Times* characterizes this latter proposition as "most viciously unfair" and demands with some warmth that the government should use its power to protect the property of its subjects and not to destroy it.

The New York ELECTRICAL WORLD takes up the same question and compares the telegraph system of the United States operated by private capital with that of England, which is operated by the government, and declares "that the private enterprise in the United States has met and meets public demands for telegraphic facilities more rapidly and efficiently than does the government service in England." From the fact that the post-office department is not self-sustaining it infers that a telegraph department would be equally burdensome and substantially opposes the scheme to establish a postal telegraph system, alleging among other reasons that there would be complaint on the part of employés, with reference to their position, rank and pay.

There are a great many things to be taken into consideration in urging upon the government the establishment of a new department which would employ so many men and require such a thorough system as would be necessary in a telegraph system. We do not believe with the ELECTRICAL WORLD that the civil service of the United States is grossly imperfect, and therefore we can see no reason why the telegraph department could not be systematized so as to give as efficient and prompt service as is now given under private control. The civil service of the United States will compare favorably with that of Great Britain or of any other country. The post-office department is most thoroughly organized and efficiently managed. A single newspaper may be traced through the railway service, and any error in its address or carriage will be definitely settled and corrected in a very short time. The system of accounting is accurate. The revenue service is a marvel of perfection as a system. So well arranged and settled are its methods of accounts and its checks upon the officers that for six years not a defalcation has occurred. The same talent brought to bear upon a telegraph system, aided by the experience that has already accumulated, would speedily arrange that department to the entire satisfaction of the business community and afford as great safety to the revenues passing through it as is possible under human agencies

The chief questions, then, as we believe them to be, are: First, is it advisable with reference to the increased patronage of the federal government to establish a new department, employing so many people? Second, in which way shall the department be established? By the purchase of existing lines or by the establishment of independent lines? If the first question be decided in the affirmative and the government determines to establish a telegraph department, the question of how the ownership of lines shall be obtained is a business matter purely. The Western Union Telegraph company own valuable property. They are liable now to competition from private capital and have been obliged from time to time to invest large sums of money in buying rival lines. If the government and the Western Union Telegraph company can agree upon the price of the property which would represent not only the intrinsic value of the material actually in sight but a reasonable value of the franchise with reference to the improvements made in the system under private management, it would seem only to be reasonable and fair that the government should take the existing lines as the simpler, quicker and more convenient method. There is no reason why the government should wantonly seek to destroy the property of the Western Union company or compel it to sacrifice its property for less than its value under fear of ruinous competition. It would seem reasonable and just that the government should take the property at a fair value arrived at by the ordinary and usual calculations that are in vogue in business circles. On the other hand, there is no reason why the Western Union Telegraph Company should insist upon an exorbitant price for their property, the profits of which they have already enjoyed, as they were entitled to do, but which have been sufficient to prevent any serious loss upon the sale of the property at a reasonable figure. There is little reason to doubt that if this question is ever reached it will be decided on the part of the government in a manner that shall protect the rights of the private owners and maintain fair dealing.—*Burlington Hawkeye.*

In the *North American Review* for November Dr. Green makes a more elaborate statement of the case, an assiduous reading of which we commend to our esteemed contemporary of Burlington.

Dr. Green, after referring to the clamor, for a Government Telegraph, asserts that "this proposition involves the consideration of both the power and the policy of our government undertaking this important commercial function. Can the government acquire, own, and operate a general system of telegraphy for commercial uses under the limited powers of the constitution? If so, is there any necessity for, or probable advantage to be derived from, such undertaking by the government?"

With regard to the power, Dr. Green ably argues that "although European governments have monopolized the telegraph within their respective dominions, except for oceanic cable service, it does not necessarily follow that the United States may lawfully do so. Ours is a constitutional government; and the very object of the constitution is to define and limit its powers and duties. In fact, the constitution is a compact or charter enacted by the several States, by virtue of which the government of the United States was created and established, and under which it still exists."

Even should the power to acquire such lines be assumed, says Dr. Green, then "the most the government can do is to hire the transmission of messages taken at and delivered from the post-offices, as it hires the carrying of mails by contract on the best terms it can make. The government does not carry the mails. It hires others to carry them, and has always done so. It has never claimed the power to build or own railroads, or steamboats, or even stage-coaches, or to appoint employés for their operation to carry on the postal service. But it is now assumed that the government may build or own a telegraph, equip it for operation, and employ a numerous staff of officers and agents for its commercial service, thus exercising powers that no one has ever claimed that it possesses in respect to the postal service."

Writing of the constitutional power of Congress to "regulate commerce between States," upon which the power to establish a government telegraphic system is mainly based, he says that the power to "regulate" does not mean, "and was never intended to mean, the power to own the plant and carry on a commercial business between the States; and much less to conduct a local traffic within a State. The reservation of the power to regulate commerce among the States grew out of the apprehension that States might impose improper burdens or restrictions on traffic with other States." Granting even that Congress could "regulate commerce between States," Dr. Green shows that "with the exception of less than half a dozen great commercial centres, more than half the business of any telegraph station is done with offices within a radius of one hundred miles. Take such a station as Columbus, the capital of Ohio, or any other considerable town in the interior of any of the larger States, and more than half its business is done entirely within the State. As to business of this class, the Supreme Court has held that it is not even, 'subject to the regulation of Congres.'"

Furthermore he says, if "the government can appropriate the telegraph, and enter upon commercial trffic in this important branch of business, it may also assume to own the railroads and carry on railroad traffic; and if the railroads, then also the warehouses and grain elevators; and if these, why not the flour mills, and, with infinitely more public benefit, the bakers' shops also? For every one of the fifty-two millions of people is personally interested in the supply and low price of bread, while there are not half a million in the whole population that ever did use the telegraph." It is not believed, and has never been judicially held, that this power to "regulate commerce among the States" goes so far as to authorize Congress to fix the price as between buyer and seller. The power to "regulate is precisely power to prevent unjust discrimination against a fair and open competition."

In conclusion he refers to the political dangers of a government monopoly of the telegraph, and says: "The argument for the monarchial governments of Europe controlling the telegraph was, that as an element of power it was a great protection against the plots and schemes of disaffected and opposing elements or parties. These elements, threatening the stability of the government, could not be allowed the advantages of the telegraph, and dare not use it. The peace of society and the prosperity of the country are involved in the stability of the government and the security of its rulers. The genius of our government is, that the people rule; it is, therefore, averse to the administrative power, for the time being, having any such advantage in directing or controlling the popular will. The telegraph would not only double the power, by way of patronage of the Post-office Department, but would give the admistration party immense advantages in warmly contested elections. Who can say that sooner or later there would not be an espionage of telegrams instituted? But, even were it adminstered with the most sacred impartiality and inviolability of the privacy of messages, the opposing party would never believe it was so administered, and would not venture to use it in the private arrangements for the prosecution of the contest."

Pender Among the Pashas.

Mr. John Pender, who has been at Constantinople for weeks, seeking an audience with the Sultan, has finally succeeded. His object in pressing for an interview was to secure a concession as promoter of a new Suez Canal scheme, which is intended to offset the plans of M. De Lesseps. Mr. Pender did not succeed, however, in making any headway. The Sultan refused to listen to all his propositions. Mr. Pender, while waiting to obtain his interview and possible con

cessions, has been giving sumptuous entertainments daily on board the Eastern Telegraph Company's cable ship. The British admiral, Mr. Charles Foster, late Chief Secretary for Ireland, diplomats, pashas and others have shared his lavish hospitality, and now the shareholders of the Eastern Telegraph Company are asking Mr. Pender, who is the chairman of their Board of Directors, who is expected to pay for all this.

The Improved Telephone Apparatus of MM. d'Arsonval and Bert.

(Concluded from page 141)

The improved transmitter of Dr. d'Arsonval and M. Paul Bert, is used with the d'Arsonval receiver, the outfit being shown in Fig. 2. The transmitter is essentially a Hughes microphone with four carbon pencils, the contact pressure being regulated by magnetism and the microphone box being suspended in such a manner as will prevent all disturbances from outside noises. The cover of the microphone box, which is shown partially removed to disclose the interior, is made of thin wood, and constitutes the speaking diaphragm, while on its inner surface are fastened horizontal strips of carbons with cup shaped depressions in which are received the pointed ends of the four carbon pencils, the strips holding the two left hand pencils being distinct from those holding the other two. The current of the battery, therefore, passes first through the first two, in parallel circuit, and then through the next two in like manner. Dr. d'Arsonval has found, in numerous experiments, that it is better to let the vibrating diaphragm support or carry both the fixed and the movable portions of the contact, instead of attaching the movable carbon to a separate portion of the box, because in so doing the occurrence of lateral movements is obviated and only changes of contact pressure are obtained. These are the only changes or variations desirable, since the lateral and other movements would tend rather more to the production of extraneous sounds at the receiver.

The ordinary Hughes microphone is subject to frying noises which disturb, if not mask entirely, the articulation of the sounds in the receiver, and it is to prevent this that the extent and freedom of the motion of the carbon pencils is regulated by magnetic attraction. The idea of regulating the contact pressure by magnetism in a microphone transmitter is not new to American electricians, for it is found embodied in the Shaw and the Baxter transmitters. It is interesting to note, however, that M. M. d'Arsonval and Bert had proposed this expedient as early as 1879.

The arrangement adopted in this instance is quite simple. The middle portion of each carbon pencil is wrapped around with a strip of sheet-iron, and behind the four pencils is placed a horseshoe permanent magnet, which can be moved by means of a regulating screw. In this way the magnet may be made to approach or recede from the carbon pencils. The firmness of contact of each carbon point with the sides of the cavity in the horizontal pieces depends on the degree of attraction between the sheet-iron covers of the carbon pencils and the magnet, and consequently by varying the distance of the latter, any desired degree of adjustment may be obtained much more perfectly than by the use of springs or by variations of weight pressure. The adjustment of weight pressure by means of springs is necessarily less satisfatory, because it involves slight unequal movements, or sliding, frictional and vibratory effects, which either exert a disturbing influence on the movement due to the sound-waves, or else introduce new elements which result in the production of extraneous sounds at the receiver. But when the variation of weight pressure is effected by magnetic action, at a distance, without contact, these sources of complication and disturbance are eliminated. This method of adjustment admits of the use of the transmitter in any position, and the regulation in each case may be effected with the greatest precision so that the transmitter may be adapted to any purpose with equal facility. The magnetic adjustment is usually sufficient to insure freedom from all undesirable vibrations which might give rise to frying noises. The bottom of the microphone box is lined with a piece of flannel that acts as a kind of muffler, which dampens all uneven vibrations. The use of this flannel has been found to improve the articulation sensibly.

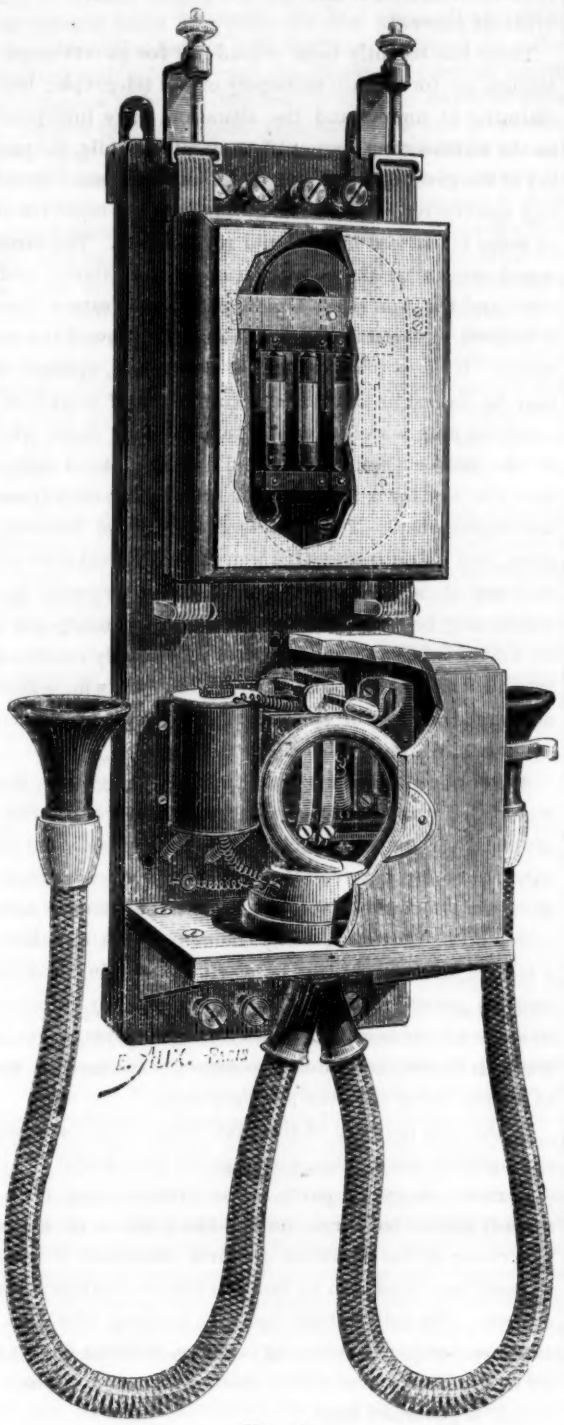


FIG. 2.

In certain places, where telephonic apparatus is to be used, as in factories containing machinery, the vibrations of the building are apt to prove a source of disturbance which becomes appreciable at the receiving telephones, as a rumbling, roaring noise, or else as a succession of jarring noises. To provide for such cases, the microphone box is not fastened directly to the baseboard, but it is suspended by two bands of elastic cloth (Fig. 2) tightly stretched above by means of nuts screwing around the eyebolts through which they pass. This mode of suspension in knapsack fashion is as perfect as it is simple, and nails may be driven by heavy hammer blows into the walls supporting the apparatus, without in the least disturbing the transmitter and causing a confusion in the words transmitted. The box below the transmitter (Fig. 2) contains the induction coil and also a d'Arsonval receiver, which is fastened inside, and provided with two flexible acoustic tubes, which the listener applies to his ear. These tubes are placed in hooks on either side of the box, the right hand hook forming the automatic switch, which is operated by the weight of the tube. Instead of one receiver, two may be used, each being then movable and provided with flexible metallic cords, as in the ordinary way, but it has been found that this arrangement increases the cost of construction without presenting any particular advantage. The circuit resistance is evidently also greater when the two telephones are used.

Fig. 3 represents a modified arrangement. The microphone box is pivoted on suspension springs between two vertical posts, like a cabinet mirror, and may be inclined in any direction. There are two receivers, connected by flexible metallic cords, and which are suspended on hooks, one of which operates the automatic switch as before.

The inventors have also produced a new form of transmitter for subscribers' stations. In this case the transmitter resembles the receiver (and is shown suspended on the left hook in Fig. 4). In this case, the four carbon pencils are supported by a circular wooden diaphragm 6 centimetres in diameter.

The sheet-iron "armatures" of the carbon pencils are acted upon by the poles of the circular magnet, which come close to them. The weight of the transmitter in this form is less than 300 grammes. The transmitter is supported by a hook on one side of the box containing the induction coil, automatic switch and signaling apparatus, and the receiver is supported by another hook on the other side of the box. This hook usually operates the automatic switch. This portable transmitter works equally well in all positions, and the articulation obtained with it is as clean and clear as with the larger types. This portable transmitter may also be supported on a small pedestal specially adapted for the purpose, and it may then be moved about, on a desk for instance. In some cases this would be a convenient arrangement.

The apparatus may evidently be modified in form to adapt it to special cases, and, besides, the forms just described, the inventors have produced other important and even more interesting ones, which are to be made public—among which, apparatus for central offices, and apparatus for transmitting theatrical representations.

FIG. 3.

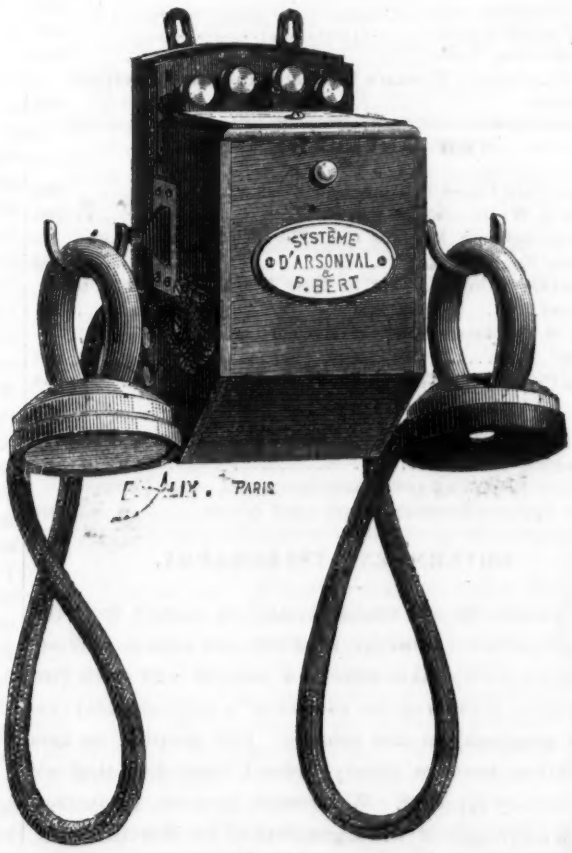


FIG. 4.

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GOVERNMENT TELEGRAPHY.

We present to our readers to-day an extract from the Burlington (Iowa) *Hawkeye*, in which our esteemed Western contemporary takes issue in a general way with THE ELECTRICAL WORLD on the subject of a governmental system of telegraphy in this country. Our position on this subject has been so clearly defined heretofore that we need scarcely repeat it. We present, however, in another column a synopsis of the arguments of Dr. Norvin Green, to be found in this month's *North American Review*, for the consideration of the *Hawkeye*, at the same time reasserting our belief, and the belief of a great majority of the practical telegraphers of America, that a government monopoly of the telegraph would be in opposition to the traditions of republican institutions, detrimental to the Yankee spirit of invention, obnoxious to all who believe that "competition is the life of trade," unwise to the very last degree, and, under our present political system, utterly impracticable. With regard to the efficiency of that system, which is extolled by the *Hawkeye*, we are afraid that Mr. George William Curtis will hardly agree with, and we ourselves humbly beg to dissent from, the opinion of that brilliant journal.

There has recently been a loud cry for government protection, or for a State monopoly of the telegraph; but we, claiming to understand the situation, have interpreted it as the unreasoning clamor of an excited public, the passing cry of the great *ignobile vulgus*—not a deliberate demand for any specific reform, but the groping of the blind for relief of some kind from fancied and real wrongs. The same demand came after the consolidation of the Atlantic and Pacific, and the American Union with the Western Union—it follows every consolidation—and it followed the recent strike. It is a protest against monopoly, against what may be classed as Gouldism, a confession of weakness and a call for help which would in turn become more irksome to the people than the original burden. As a matter of fact, the cry for a government telegraph comes from the anti-monopolists. This class is generally the laboring element, and its representative journals and speakers—no one will say it is the capitalists. As a government system would only be to tax the entire nation so much per head for all the telegraphing done, it would simply resolve itself into a scheme to tax the average laborer, who seldom or never telegraphs, for the telegraphing done by the banker or broker, who is "wiring" all the time.

As for the government building competing lines, this too would be an unjust tax on millions who never use the telegraph. As a matter of fact, private enterprise could to-day carry the mails between the larger cities cheaper than the government could when burdened with the mail between points on its Star Routes and the consequent expense; and a telegraphic competition between the existing companies and the government, with the latter honestly endeavoring to serve *all* the country, would leave the government hopelessly in the financial mire, because the companies would, of course, serve only the paying points.

In the vast increase of the Civil Service list, as at present exemplified, the change would prove distasteful to every American of every party. Our officeholding class has already grown too large, though the position of the chief proprietor of the *Hawkeye* as First Assistant Postmaster General may lead him to look with more leniency on the system. We believe that there is nothing like full, fair and free competition among citizens, without government let or hindrance, and that "that country is governed best which is governed least."

The Electric Light Abroad.

An occasional glance at the European papers is sufficient to reveal the fact that the electric light gains ground almost as rapidly in the Old World as in the New. Its present and proposed uses are very varied. Nearly every large ocean steamer that is now launched has its full plant for electric lighting, and steamers already running are also supplied. The Swan United Electric Light Company have orders to fit the fine White Star liner "Adriatic" with 132 lamps of 20 candle-power and 150 of 12, driven by Siemens' alternate current dynamos; and if this proves satisfactory, the whole fleet will be similarly equipped. The same company are to fit the "Clan Mathieson," now building at Glasgow, with incandescent lamps; and the steamer "Cahors," for the Australian trade, is to have an installation of about 150 Woodhouse & Rawson 10, 20 and 50 candle-power incandescent lamps. Going by a natural transition from steamers to lighthouses, we find that the old light in the Calais, France, lighthouse has given way to an electric light visible from a distance of about twenty-four miles. In mines the light is of service. At Foxdale, in the Isle of Man, Maxim incandescent lamps have been used at the bottom of a shaft where men were engaged in sinking, and the Hammond Company have secured a contract for lighting the new shaft of the Wigan Coal and Iron Company, at Wigan, in the north of England.

As in this country, private individuals are using the light freely in their houses in England, and one of the latest instances is that of Mr. Cassell, in the west of London, whose house is to be lighted by Swan lamps, a 6 horse-power engine driving the dynamos. His neighbor, Mr. W. S. Gilbert, has a similar installation, and is writing brilliant things with its help. The use of the light on special occasions is also to be noted. When the King of Spain visited Brussels, the Belgian government lighted his path with Jaspar, Gramme and Brush arc lamps. The great Leeds Musical Festival was illuminated last month by a Birmingham firm, who made the Victoria Hall a scene of dazzling splendor with the light in its incandescent form; and at the soiree of the Library Association of the United Kingdom, at the Free Library, Liverpool, the rooms were brightened by the popular Swan lamps. At Levenshulme, near Manchester, a large print works will have an installation of 150 Swan 20-candle lamps. Seven arc lights have been put up in the streets of Winchester experimentally, and the Brush lamp has shed its genial beams over the swimmers at the baths of romantic Ilfracombe on the north coast of Devon.

The list might be extended, but we will only add now that the grounds of the Calcutta International Exhibition are to be lighted by arc and incandescent lamps for the delectation of the mild Hindoo and his British rulers.

Death of a French Electrician.

The French journals announce the death of M. Alfred Niaudet, an electrician and writer whose name is well-known to electricians and scientists on this side of the Atlantic. During the whole of his lifetime, M. Niaudet always identified himself closely with the advancement of electrical science and the progress of its applications. He was an ardent student of scientific principles, and those who deem the possession of knowledge and the advancement of science a sufficient inducement to research and study will feel the loss of a zealous colleague in his death. On the other hand, M. Niaudet possessed faculties, in combination with these aptitudes, that will make his death regrettable to those also who are concerned with the industrial side of science. Many inventors, among others M. Jablochkoff, have had occasion to benefit from this valuable though seemingly incompatible combination of scientific knowledge with business capacity, which enabled him to assist and advance their inventions to the goal of industrial recognition by removing the scientific as well as the business difficulties in the way. He was connected for many years with the house of which the late Antoine Breguet was the head, and contributed largely to establish its reputation for electrical work. The large part which he took in developing electrical industries is shown by the fact that at the time of his death he was a director of the Société Générale des Téléphones, of the Compagnie Electrique, of the Société de l'Eclairage Electrique, and president of the Compagnie Internationale des Téléphones. He had been a member of the Société Française de Physique since its foundation.

He was a frequent contributor to the French scientific periodicals on various subjects, having formed a part of the "Comité de Rédaction" of one of the ablest electrical reviews, *l'Electricien*. His work on galvanic batteries, which went through several editions in French, and which was translated into other languages, is the best authority on the subject. The American translation by Mr. Fishback has been so well received in this country as to leave no doubt on this subject. M. Niaudet also published a small work on "Continuous Current Dynamo-Electric Machines," which is remarkable for its clearness. This work was also the best and most complete on the subject at the time of its publication. What made M. Niaudet's writings valuable was the evident disinterestedness and the candor, we might add frankness, with which he treated the subject under consideration. In his style he was entirely natural and unaffected, just as the *littérateur* of a science as technical as ours should be. M. Niaudet was only forty-eight years of age.

By Way of Improvement.

Our readers will have noticed—indeed, some of them have already expressed their approval of the change—that we are using paper of a much finer quality than heretofore. That which we were using is considered good enough by many journals of high standing, but we have been desirous of improving the general appearance of THE ELECTRICAL WORLD, and, at the same time, of giving its numerous fine illustrations and diagrams all the advantage possible. If any one will take the trouble to compare this journal with the best magazines, it will be seen that we have been as unsparing of the finest paper as the Harpers, the Lippincotts, or the *Century* Co., and that in our case, as in theirs, the illustrations and letter-press alike are thus more pleasing to the eye. The additional outlay for paper so highly calendered runs into thousands of dollars, but that has been the least consideration with us in presenting a paper that should worthily speak for and to the electrical public at home and abroad.

Another change we would like to call attention to is that affecting electrical patents. It will have been observed that we now make a distinct department of these. We began by giving simply the name of the invention, the number of the patent, and the name and address of the inventor. Later, we added cuts and descriptions of two or three of the most valuable patents granted each week. Then we deemed it proper to increase the number of cuts. Now, we have a standing order at Washington for the specifications of every electrical patent issued from the Patent Office, and our intention is to give from these clear, concise and intelligent information as to what electrical inventors are doing, and to give cuts whenever their aid is necessary to the reader.

This is an important step in advance. It entails expense again and much hard work by experts, but we believe it will make THE ELECTRICAL WORLD so invaluable to electricians that we shall be repaid in time by their appreciative support.

The Protection of Telegraph Cables.

The conference held at Paris to determine questions connected with the protection of submarine cables has been brought to an end. The most important feature in the conference was the English proposal that, in the event of war, any power will be at liberty to withdraw, with the right of readmission when peace has been concluded. The conference adopted this principle. This means that in case of war any power may cut cables at its own risk and peril. The cables must take chances similar to other property at sea.

The conference unanimously signed the draft of a convention for the protection of telegraph cables. M. Cochery, the French Minister of Posts and Telegraphs, expressed at the conference the hope that the convention would be sanctioned by treaties within three months. The question of the protection of the cables in time of war was reserved for diplomatic discussion.

The convention will apply, outside of territorial waters, to all submarine cables legally laid which touch the land in the territories of the contracting parties. The latter bind themselves, when authorizing the landing of cables, to impose conditions for their protection. Laying or repairing ships must observe the rules to avoid fouling. The tribunals competent to deal with infractions of the convention will be those of the country to which the ship in fault belongs. Ratifications will be exchanged at Paris within a year. Other States may join the convention on making application.

It is evident that the conference has arrived at some definite results, but the principal comment in order is that England appears to play a new rôle. "Proputty" is a thing of such peculiar sacredness in the eyes of Englishmen that we are somewhat surprised to find England proposing to leave it at the option of any power to withdraw from the cable protection league of nations in time of war. England is the largest owner of cables, and this is one great reason why she should insist on the neutrality of cables at all times. Perhaps she believes that her fleet could as easily protect her cables as con voy her merchantmen, but we can hardly think that Mr. John Pender feels happy over the proposal of the English representatives.

A Common Meridian.

The report of the committee of the Geodetic Association, presented at the general meeting of the Conference at Rome, Italy, on the 24th ult., favors the universal adoption of the Greenwich Meridian, and also recommends as the point of departure of the universal hour and cosmopolitan dates the mean noon of Greenwich. Part of the scheme of the Conference contemplates that each town of importance shall have a public time signal-station electrically connected with a central observatory for the purpose of receiving and disseminating standard time with precision. Another feature is that all railway and public clocks should be connected electrically from the public time signal-stations.

The Realm of Marvel.

Scientific journals published in this country have been accused of drawing on their imagination for their facts in regard to the latest applications of electricity, and it is possible that some of them in an hour of exaltation or jocularity have lit up otherwise dreary pages with highly colored statements that the facts would not substantiate. *Punch*, which was once, we believe, a comic paper, but now ranks with the London *Times* for gravity and sobriety, carries off the palm from our American contemporaries with the following jeu d'esprit, that recalls its old brilliancy:

The baby does not seem to take to the electric feeding-bottle. He is now in strong convulsions. From the fact that my new electric razor nearly severed my jugular vein this morning, I conclude that the current must be turned on a little too strong. It certainly is a great blessing to have one's coffee ground, the carpets dusted, the hot water brought up stairs, all the clocks in the house wound up, and the front door slammed in the face of the tax collector simply by turning a small handle down in the wine cellar. We really must impress on our next house-maid that the proper way to light the Swan burner in the hall is not by grasping both wires firmly, previous to applying a match to the ends, or the hospital authorities may refuse to receive any more of our cases. Now that the electric boot-cleaner has torn the buttons from my best outdoor pair of boots, and scorched all the French polish off my dress shoes, I think we may call the contrivance an unqualified success. I am sure my mother-in-law would like to sleep in the room with the "New Patent Electric Surprise Bedstead" in it. The "Little Marvel" machine which turns me out of bed, puts my clothes on, gives me my breakfast and propels me in the direction of the railway station five minutes before the morning train starts, had better be set for 9:30 o'clock to-morrow. The "Electric Family Prayer Reader" must certainly be out of order, as it has given us the same chapter of Genesis for the last three mornings. Judging from the livid appearance of the cook, who is now lying insensible under the kitchen table, I fancy that in trying to light what she calls "that there dratted lamp," she must have unintentionally "completed the circuit,"

A Noted Cable Steamer.

The Faraday, which is to be employed in laying the new cables of Messrs. Bennett & Mackay, was, unlike all other cable vessels, built expressly for the purpose of laying cable. Her dimensions and outfit are imposing. Her grappling and cable-paying machinery are not on board. She measures in length 360 feet; beam, 52; depth of hold, 36; register tonnage, 5,000. She has two screw propellers driven by a pair of compound engines of 250-horse power each, thus making her very handy. She can be turned inside of her own length. She is a "double ender," with bow and stern alike, enabling her to pay out cable at either end. She has two rudders, one forward and one aft. She was built in ninety working days, but is none the less a stanch, seaworthy craft, riding the roughest sea very easily. She has three decks and a hurricane deck, three masts and two immense tanks wherein can be coiled 7,000 tons of cable, in miles 2,000. She is the only vessel that can carry and pay out an entire Atlantic cable at once. She laid the direct United States cable in 1874 between Ballina, Skelligs Bay, Ireland, to Tor Bay, N. S., thence to Rye Beach, N. H.; also the cable of the Compagnie Francaise from Brest to Nova Scotia and Cape Cod, in 1879, and the Brazilian cable between Rio Janeiro and the confines of Uruguay. In 1881–82 she laid Jay Gould's two transatlantic cables, and was a repairing ship stationed at Halifax for fifteen months in 1876–77. The Ambassador and Dacia were the Faraday's consorts in laying the direct United States cable. The Faraday has laid over twelve thousand miles of cable and has picked up an end from a depth of two and a half miles. She was launched at Newcastle in 1874, belongs to Messrs. Siemens, of London, and is lighted throughout by electric lights.

An International Electrical Society.

An International Society of Electricians, which has been founded in Paris, under the honorary presidency of the Minister of Posts and Telegraphs, may be regarded, says the *Industrial World*, as an outcome of the Electrical Exhibition of 1881. Since that year a number of electricians have been in the habit of dining together once a month, and in June last these informal meetings were consolidated into a society, for the formation of which a committee has been appointed. Two members of this committee, M. G. Cabanellas and M. de Meritens, prepared reports describing the object, scope and expected position of the society, and a set of rules was drawn up and approved of by the committee. The first article of the statutes states that the International Society of Electricians will admit any Frenchman or foreigner who in any manner—general, scientific, industrial or commercial—interests himself in the theoretical or applied development of electricity. The objects of the society are: To accumulate by communications and discussions information and documents concerning the progress of electricity; to popularize and extend the usefulness of this sort of energy by meetings, publications, conferences, premiums in instruments or in money, or by any other means. The society will consist of honorary members, ordinary members and foundation members. The first will be admitted by virtue of their distinguished abilities and labors, and the last, those who enter as ordinary members, before the 15th of October next. Election must be preceded by the recommendation of two ordinary members. The annual fee is fixed at twenty francs, which may be compounded by one life payment of 250 francs. For the present the meetings will be held on the first Wednesday of each month from the 1st of October to 1st of July. A journal will be published in connection with the society, the office of which is at 99 Rue de Grenelle, Paris.

Sub-ways in Large Cities.

Tunnels under the principal streets of Paris, says the *Evening Post*, carry all the drains, pipes and wires—these veins, nerves and muscles of the body municipal. Everything can thus be got at for inspection and repair without expense and without interfering with the travel above. The model city of the future will undoubtedly have two roadways and perhaps a third for rapid transit. But till lately Paris was the only city that had perceived that to build a tunnel once for all is cheaper than to be continually digging and filling and paving and re-digging and re-filling and re-paving a ditch. London has now made a beginning in the same direction. Down the middle of Southwark street is a sub-way of semi-circular shape and 12 feet diameter, the crown coming just below the pavement. Side passages, three feet wide, are made from the sub-way on each side for each pair of houses. Glazed stone-ware pipes laid at a sufficient inclination bring the house drainage into an egg-shaped sewer built immediately under the sub-way. Gas-pipes and water-pipes are and electric wires can be carried through the sub-way itself. Light is obtained at intervals by circular openings in the crown of the road-way. The Paris sub-ways are, we believe, lighted by gas. The system once introduced is sure to spread, for, though the initial expense is great, there must be economy in the long run; and the lighting, heating and water companies can be made to bear their share of the cost.

Why the Telephone Wouldn't Work.

[From the Chicago Daily News.]

"Rrah-ta, tum-tum, allemen! — left! — whoop-la!" was the substance of what a *Daily News* reporter heard through the telephone after trying fifteen minutes to get an answer from the central office. Ten minutes more work in grinding the crank of the 'phone resulted in nothing save goading the city editor to paraphrase the most celebrated remark of William H. Vanderbilt by changing the word "public" to "telephone." Still the medley of sound came drifting over the wires uninterrupted by the frantic "helloes" from the *Daily News* editorial rooms. Shortly after the reporter, with an air of desperation about him, marched into the telephone office on LaSalle street.

"Where is the place where you ring the telephone bell to?" he asked, rather incoherently.

"Oh, you mean the place where they answer the telephone," said the superintendent. "It's right across the street."

"No, I don't; I mean the place where they don't answer," and the *Daily News* investigator departed. A climb of several flights of stairs carried the reporter to a place where, in a dark hallway, the sounds of the telephone could be heard. "Peek-a-boo, p-e-e-k-a-b-o-oo," in a shrill girlish voice, intermixed with more of the old familiar music of the wire, "arahta-tum-tum—now you stop," and the noise of moving feet were distinctly audible. About this time the manager came up the stairs and expressed his desire to assist the reportorial investigation. He pounded on a door with his knuckles. The music came to an abrupt stop. The door opened and he manager and his companion were ushered into the presence of three boys and two girls, all very demure and quiet.

"Oh, you must have neglected to hang up the receiver," said one of the girls. "What's your number? Did you wait for an answer?" and a string of other queries and assertions, winding up with the startling announcement: "The *Daily News* hasn't got any telephone."

A Voice from Texas.

To the Editor of The Electrical World:

SIR: Contesting priority claims in electric invention and introduction is the fashion just now.

In your issue of Oct. 13, under the head of "Telephone Fire-Alarms," credit is given the North Pennsylvania Telephone Company for the first practical inauguration of the Telephone Fire-Alarm System. Date of said inauguration is not given. If it did not occur previous to April 30, 1883, your humble servant would modestly enter a mild protest.

On that date the Southwestern Telephone Company gave to Houston, Texas, a telephonic fire-alarm system. Each engine house is supplied with a telephone, and alarms are struck on the fire-alarm bell from the Central Office. The perfecting of this arrangement gained for that exchange a five-year free-of-rent lease on the best location in the world for a central office, the Market House tower. A citizen of Houston, by ringing up Central Office, and naming a certain place, may have the Fire Department there in seven minutes, and the bell rung in less than seven seconds.

The contestor, having shed considerable perspiration in the conception and completion of this arrangement, and in moving the Central Office to carry it into effect, would wish quietly to corral what honor or credit may be attached thereto. G. W. FOSTER.

GALVESTON, Tex., Oct. 18, 1883.

Underground Wires in Berlin.

To the Editor of The Electrical World:

DEAR SIR: In your issue of September 15, I find a remarkable assertion accredited to "Consul Kreissman, who has resided in Berlin for a long time," to the effect that, although a large amount of telegraph and telephone work is done in Berlin, not a wire is to be seen!!

Now, Mr. Editor, either Mr. Kreissman "resided in Berlin for a long time" before the invention of the telegraph, or his statements are made in the interests of some "Conduit Company."

I have been in Berlin six different times during the last two years (the last time being about four weeks ago), and one of my visits was purposely to investigate the telephone business there, as the Russian telegraph people thought they preferred the Berlin housetop construction to ours.

All of the telephone wires in Berlin are *overground;* the system of construction is the "Siemens hollow pole," with cast-iron saddle to fit the ridge of the roof, and iron and wire stays to hold the fixtures firm.

There are no telephone wires underground except a few trunk lines, which were an experiment and were afterward abandoned, I have heard.

I have visited several of their central offices (which reminded me of our starting in America), and have been on the roofs and spoken with the chief of construction.

I have no other motive in writing you than to correct a gross misstatement of facts, but should any of your readers doubt me I have abundant proofs to back me, and can also refer to the engineer of the Edison Electric Light Co, in Berlin, an American, who can fully substantiate my statements. JOHN CRAWFORD, Chief Engineer.

WARSAW, POLAND, Oct. 8, 1883.

The Proposed Produce Exchange Line.

Last week we gave details as to the intention of the New York and Chicago Produce Exchanges to have a telegraph line of their own. The proposed line is that of the New York, Chicago & St. Louis Railroad Company and New York, West Shore & Buffalo Railroad Company, owned by the National Telegraph Company. This line can be purchased for $1,000,000 in 6 per cent. bonds. The committee has the refusal. The committee recommend that a company, composed exclusively of members of the New York Produce Exchange and of the Chicago Board of Trade, be formed, and that the former take $600,000 of the stock and the latter the remaining $400,000. In order to prevent consolidation, no member should be allowed to take more than $500 in stock.

A committee of five was appointed to open books of subscription, and a copy of the report of the committee sent to the Chicago Board of Trade with the request that it take action. The report has been received by the Board of Trade. As an illustration of the necessity of an exclusive wire, the committee stated that there are five New York firms, connected with Chicago firms, whose aggregate business over the wires is more than $100,000 yearly. The report states that the proposed line extends from Weehawken, N. J., to Grand Crossing, eight miles from Chicago. The present owners offer to pay $50,000 for the completion of the line, but the committee think that it will only cost $9,262 to complete the Chicago terminal, and about $4,000 to finish it from Weehawken to New York City.

To complete the Chicago terminal necessitates building a pole line containing four wires from Grand Crossing to Thirty-ninth street, four and one-half miles, thence three and one-half miles by cable along the lake shore to Van Buren street, through the sewer of which, four blocks, it runs to the Board of Trade, making in all a line of eight miles, which can be built at an estimated expense, viz.:

For 4½ miles pole line at $400 per mile	$1,800
18,480 feet 4 wired armored cable at 38 cents a foot	7,012
Laying, splicing, etc., about $100 per mile	450
Right of way	
Total	$9,262

The line passes through eight cities, each containing more than 30,000 inhabitants, which with the terminal cities of New York and Chicago gives a large field for business. The committee believe that with a low rate of 10 or 15 cents a message, telegraphic business would be greatly increased and the line consequently encouraged, and that the business of the two exchanges would also be greatly increased.

Some of the criticism directed against this programme is very strong. One correspondent says in the daily papers: The committee then go on to state that ten additional wires may be erected on the poles, and that these additional wires will transmit 3,120,000 additional messages per annum, making in all 4,555,700 messages yearly. The total number of messages transmitted annually between the New York and Chicago Exchanges by all the telegraph companies is about 250,000.

The difference between 250,000 messages now transmitted and 4,555,700 which the committee propose to transmit is 4,305,700.

It is evident that the committee do not intend to permit the existing telegraph companies to do any business between the exchanges of the two cities. It is not clear how the committee are to get the 4,305,700 additional messages. However, the committee appear quite certain that they will transmit all the existing business of 250,000 messages, which they propose to send at ten cents each, or $25,000 per annum for the whole; but as they estimate the interest on the bonds and the cost of maintaining and operating the lines at $161,679.88, it is difficult to see the profits. The committee, however, suggest a way of making a great deal of money, and that is by charging fifteen cents per message. Let's see:

Expenses	$161,679.88
Receipts, 250,000 messages at 15c	37,500.00
Deficit	$124,179.88

It is understood, moreover, that the railroad company is to have exclusive use of two of the four wires. This would make heavy work for the other wires, and the same correspondent remarks: "As has been shown above, there are not 4,000 messages per day to be transmitted between New York and Chicago. But if this amount of business could be obtained it would be utterly impossible to handle it on four wires by the Morse system, which is the system estimated upon by the committee's expert. The greatest average capacity of a single wire during exchange hours is about 350 messages per day, say of five hours, or an average of seventy messages per hour."

The International Bell Co.'s Statement.

The directors of the International Bell Telephone Company (limited) have prepared a statement of the business and condition of the company, in which they say the capital stock is 17,000 shares, of the par value of $100, of which 3,130 shares are held by the Central Trust Company of New York in trust, to be exchanged when presented for $313,000 six per cent. convertible bonds sold at par for cash. The debt of the company is the above bonds and a floating debt of about $125,000 advanced by bankers. The managers in Europe ask for further remittances of $75,000 before January 1 to prosecute the work. The assets of the company consist of patent rights, etc., for the telephone in Belgium, Germany, Austria, Italy, Spain, Portugal, and Russia, with rights and good will in the invention in Sweden, Norway and Holland. The company owns lines and exchanges in Norway with 900 paying subscribers, in Russia with 1,447 paying subscribers, exchanges of nominal value in Italy, besides a stock interest in other companies in the above countries of the par value of $670,750 and $40,000 in the Bell Telephone Manufacturing Company of Antwerp, which is doing a large business. The number of subscribers to the above exchanges July 1, 1883, was 9,647, a gain of 1,744 since October 1, 1882. The company has been actively engaged in construction from its organization, and the extension of its lines has always required the outlay of more than its receipts from business. The gross receipts from January 1, 1883, to June 30, were $124,855.79, of which $82,071.64 properly belonged to that period. The running expenses were $37,250.43, making the net earnings $44,821.21. The directors expect larger receipts for the balance of this year, and especially for the year 1884, when the Belgian and Italian companies and the Bell Telephone manufacturing companies are to begin paying dividends. A fusion has been made between the companies at Milan, Genoa and Turin and the Société Italienne, a wealthy French company having exchanges in the same cities, which ends competition. The company expects to fund the floating debt and begin paying dividends in 1884.

A New Cable in the Narrows.

A party of gentlemen connected with the Baltimore & Ohio Telegraph Company started down the harbor on Sunday, the 28th ult., from the Vanderbilt landing at Staten Island, to superintend the laying of a third cable across the Narrows between Fort Wadsworth and Fort Hamilton. Each of the cables is kerite covered, manufactured by Mr. A. G. Day and has seven conductors. The first cable was laid in August, 1882, and the second in April, 1883. The cable laid down on Sunday weighed twelve tons. It was 6,300 feet long, 1⅛ inches in diameter and 5½ inches in circumference. Altogether the three cables of the Baltimore & Ohio company have twenty-one conducting wires, uniting New York with various points West and Southwest, and cutting into the business of the Western Union. There was too much work for the first two cables, so a third had to be laid.

Mr. Robert Stewart, superintendent of the telegraph department of the Baltimore & Ohio Railroad, took charge of the operations, assisted by Mr. J. C. Hankinson, superintendent of construction; Mr. C. W. Price, manager of the New York division, and Mr. J. McGlathery, assistant to Mr. Hankinson. There were also present Mr. A. G. Day, manufacturer of the cable, 120 Broadway, N. Y., and Mrs. Day, Judge Charles S. Church, Thomas Church, and Mr. Ferdinand Joline. The cable paid out beautifully, sinking gracefully to the bottom of the channel at a depth of over one hundred feet. The operation was delayed for the turn of the tide so that still water might be obtained. The actual laying of the cable took exactly thirty-four minutes, that of 1882 twenty-seven minutes and that of last April twenty-five minutes. The present cable, however, was the heaviest of any. After the laying had been successfully accomplished, the party lunched at the house of Judge Charles S. Church and then returned to the city.

The Electric Light in Lincoln Park.

We referred in the Oct. 20th issue to the illumination of Lincoln Park, Chicago, by the Fuller Electric Light: Referring to the matter, the *Tribune* of that city says the new manner of lighting the park turns it every evening into a series of the loveliest moonlight landscapes the most poetic mind can imagine, and those who stroll through its serpentine walks, along the borders of its miniature lakes or over its dewy lawns have been impressed with the enchanting loveliness of the constantly changing scenery. The lights are placed on masts, just high enough to shed over their respective territories a soft, moonlike gleam of silvery hue, throwing deep black shadows where the rays are interrupted by clusters of trees or picturing on the white expanse of lawn or past the trees with all the branches and leaves like gigantic silhouettes. The light flickers a little, the *Tribune* adds, and in that way causes a constant change in the depth of the shadowing, giving the scene really a far more animated character than it would otherwise possess. The effect of this artificial moonlight on the different sheets of water in the park is also quite magical. The light seems to be of sufficient novelty to the denizens of the park waters to startle them to some extent. The old gentleman swan who bosses the small pond just north of the refectory seemed in a great state of excitement about the novel appearance of his domain. The water had an inky black hue, but the banks glistened in many places, and two or three brilliant rays fell across the black expanse, like silver stripes on black velvet. The old swan rowed himself to and fro to investigate the cause of the queer phenomenon, and it was quite a study to watch the old fellow, how he sometimes dived into utter darkness, to soon appear again majestically moving along in a perfect glow of light.

The geese seemed also alarmed. They were huddled together on the little island north of the refectory, one side of which island was glistening in the white light while the other appeared as black as the deepest night, and, to judge from their excited chattering, were engaged in a kind of indignation meeting.

The animals in the zoölogical department did not seem to be affected by the new light to any extent, but the view across the expanse of flower-beds adjoining their cages was grandly beautiful.

One must really see the park lighted up by electricity to fully appreciate its newly-developed charms, says the *Tribune*, in conclusion; no description can do it justice.

THE TELEGRAPH.

ANOTHER OF MORSE'S ASSOCIATES GONE.—Mr. Waterman L. Ormsby, Sr., died Nov. 1st, at his home in Brooklyn, N. Y., aged 74 years. It is said that he aided in the first telegraph experiments by Professor Morse and Mr. Henry A. Munson.

A SIGNAL TELEGRAPH.—A signal telegraph is now being established between the islands of Mauritius and La Reunion, the plan of laying a submarine cable having been abandoned. In spite of the great distance between the islands (about 150 miles) the experiments with the signal telegraph, by means of a reflector, were very successful.

UNDERGROUNDING IN NEW YORK.—A short time ago an embargo was placed on the further laying of underground pipes in Broadway for conducting telegraph wires of the Western Union Telegraph Company, and the police stopped the work when the pipes had reached as far as the New York Hotel. On Friday of last week a general alarm was sent out from Police Headquarters not to interfere any further with the laying of these pipes.

IN LUCK.—Garrett L. Oakshot, a Mutual District Telegraph messenger, 17 years old, in Boston, has fallen heir to $14,000, left him by some mysterious benefactor who became acquainted with him when he was a telegraph messenger in New York, but whose name the boy refuses to give. Young Oakshot is going to St. Paul, Minn., where lives his uncle, who has charge of the legacy. Oakshot is an orphan, faithful and industrious, and in every way his good luck is deserved.

THE T. M. B. A.—The one hundred and sixty-ninth assessment of the above association, dated Oct. 31, relates to the death of Asa C. Dobbins and Clara S. Gruber. In the first case, the claim will be paid from the surplus; in the second, a dollar is due from members holding certificates up to and including No. 4,606. This assessment should be paid before the 30th inst. Assessment No. 5 in the Second Division is called for to meet the claim of Daniel H. Henshaw. The sum is one dollar, due from members holding certificates up to and including No. 200.

THE PRODUCE EXCHANGE PROJECT.—Messrs. S. A. Sawyer, W. A. Cole, Alexander E. Orr, David Bingham and R. H. Laimbeer, members of the Produce Exchange, have been appointed by President Herrick a committee to carry out the resolutions adopted at the meeting of the Exchange members at which the report of the Committee on Telegraph was considered. The committee will place itself in communication at once with the Chicago Board of Trade, without whose co-operation the scheme could not be carried out.

THE VALUE OF WESTERN UNION.—A leading Wall street broker said this week, speaking of stock values: "Take Western Union, for instance. It is an immense property and pays 7 per cent. regularly. People say that the Western Union plant could be duplicated for $20,000,000. But the Produce Exchange is negotiating for a telegraph to Chicago, and the offering price is $1,000,000. If a line to Chicago, honestly built, will cost $1,000,000, the Western Union lines, ramifying through the whole country, must be worth an immense sum. Why then does Western Union sell at the present price when government bonds, paying 4 or 5 per cent., sell so much above par? It is simply because of the prevailing distrust of all stocks. When the public confidence is restored we shall have a better market."

THE RAPID COMPANY'S MORTGAGE.—The mortgage for $3,000,000, recently filed in the register's office at White Plains, N. Y., by the American Rapid Telegraph Company, is the instrument whose purpose has been already described in these columns. It is to furnish the funds for extending the lines of the company, and the bonds under it are taken by the Bankers' and Merchants' Telegraph Company, with which the American Rapid is virtually consolidated, and which is to build the lines. The mortgage runs to the Boston Safe Deposit and Trust Company, and is payable on the 15th day of September, 1893. The interest, at 6 per cent., is to be paid semi-annually, coupons calling for the payment of $30 on the 15th of March and the 15th of September of each year being attached to each bond. A copy of the mortgage will be filed in each town in Connecticut through which the lines of the company pass.

TAMPERING WITH THE WIRES.—The cutting and tampering with the district wires of the Western Union and Mutual Union Telegraph Companies, mentioned some weeks ago, says the *Hartford Courant* of Oct. 25th, still continues. Two of the circuits have been practically useless for a week. Two men spent four days testing from box to box, finding six places where the wires had been

cut, mostly inside of the buildings, where the fine wire connecting the box with the outside wire, was cut, and in such a way as to leave no doubt of its being done intentionally. At noon yesterday they were in working order, but at 2 o'clock both went open again. At 2:30 p. m. a third circuit was cut, leaving the Western Union Service with but one wire. In one case on the Mutual Union wire it was cut with a sharp instrument at a point where it passed through a window casing. The two ends were shoved back into the hole and a concealed tack driven over the fine wires so that if the repairer should happen to pull on it to see if it was broken, the tack would hold the wire and he of course, would assume the wire to be intact. This tampering with the district wires has continued for four or five weeks.

THE TELEPHONE.

THE OVERLAND CO.—A dispatch from Cincinnati, O., says that the Overland Telephone Co. has been organized there with a capital of $300,000.

FOR RIO DE JANEIRO.—The Tropical Telephone Company of Boston is just shipping $25,000 worth of instruments to Rio de Janeiro, the money for which is deposited to its credit in New York.

"THE GOOD TIME COMING."—Recent experiments have demonstrated that the day is not far distant when people will be able to order their tea direct from China by telephone. This is the age of wire and wind.

TELEPHONE SUBSCRIBERS' LISTS.—An enterprising stationery firm in St. Louis, Mo., in getting out a list of subscribers to the telephone, score a good point in saying "it goes to every business house of size and is used many times each day, not, like the newspaper, thrown away."

THE PENNSYLVANIA TELEPHONE COMPANY.—This company has nearly five hundred subscribers in the city of Reading and vicinity. The company has just opened communication with Lancaster, York, Norristown and intermediate stations, and the construction of new lines is being pushed forward as rapidly as possible.

THE NEW YORK T. AND T. CO.—There was filed with the County Clerk, New York, last week, the certificate of incorporation of the New York Telegraph and Telephone Company, the capital of which is to be $1,000,000. The corporators are George D. Hyde, Joseph W. Mandeville and George Gehe, and the operations of the company are to be carried on in this city.

THE U. S. OVERLAND T. AND T. CO.—A dispatch from Syracuse, N. Y., of Oct. 27 says: In this city and Utica $500,000 have been subscribed for the organization of a branch of the United States Overland Telephone and Telegraph Company, with headquarters in this city. The object is to afford a local telephone service and to build lines connecting with outlying villages.

A STRIKING GROWTH.—The increase in the subscribers of the several telephone companies, under the Lowell management, since Nov. 1, 1882, shows as follows:

Companies.	Connected Nov. 1. 1882.	Connected Oct. 1. 1883.	Inc.
National Bell of Maine	3,600	4,017	417
Boston and Northern..... ..	2,500	3,479	979
Suburban	610	1,578	968
Bay State.....	2,100	2,888	788
Manchester	410	403	Dec. 7
Union...	240	465	225

THE RANDALL TELEPHONE.—The National Secret Telephone Co., using the Randall telephone, has issued a long prospectus, bidding defiance to the American Bell people, and basing much of its argument and appeal on the "admissions" of Mr. E. Berliner in a letter to THE ELECTRICAL WORLD, published on Oct. 6, and replying to Prof. Thompson on the claims of Reis to priority of invention.

AN OHIO COMPANY REORGANIZED.—The Xenia, Ohio, Telephone Company has been reorganized under the name of the Miami Telephone Company, with the following officers: John Little, president; S. M. Allison, vice president; C. C. Shearer, secretary; John S. Ankeney, treasurer, and L. H. Whiteman, manager. The new company has a capital stock of $30,000 and will deal in all kinds of electrical appliances.

TELEPHONE EMPLOYES ARRESTED.—Three employés of the Baxter Telephone Company were arrested in Philadelphia, on the 30th ult., by policemen acting under general instructions recently given by the Chief of Police relating to the running of telegraph wires across buildings without a permit. The wiremen were stretching wires in the neighborhood of Eighth and Wood streets. Magistrate Lukens held them until their superintendent could be notified.

APPRECIATIVE VENEZUELA.—The Inter-Continental Telephone Company of Boston has now 136 subscribers in Caraccas, Venezuela, and orders for more which cannot be filled till the 100 sets of instruments already shipped are received. The company expects to have 200 subscribers in Caraccas and Laguayra by January 1. The line through the coffee district, which is a four-wire trunk line, is doing a large telegraph business. Its messages in the busy season will average from 200 to 250 per day. With a plant costing $15,000 its receipts are expected to equal that amount within 18 months.

A FINE EXHIBIT.—The London *Standard* says: The Consolidated Telephone Company has made a beautiful exhibit for the Oriental Company (which has rights over India, Africa, China, Australia and Japan) to be shown at the Calcutta exhibition. For workmanship and finish the instruments are of the highest order. The woodwork is of solid maple, with gold mountings; and one set is characterized by an improved transmitter, which rectifies a common defect in all the existing microphones, and enables all tones of voice to be sent equally well.

SPREAD OF THE TELEPHONE IN MARYLAND.—The growth of the telephonic communication throughout Maryland is a striking feature of progress and enterprise. There are systems in Western Maryland, Eastern Maryland, in the central counties, and now agencies are at work by the Chesapeake & Potomac Telephone Company to connect every point of prominence in Anne Arundel with Annapolis, and the Baltimore and Washington line, and points in Cecil county with Wilmington, Philadelphia and Baltimore, as well as other sections of the States of Maryland and Delaware.

SUING THE OVERLAND.—A bill in equity was filed by counsel for the American Bell Telephone Company in the United States Circuit, Philadelphia, on the 27th ult. against the Penn Overland Telephone and Telegraph Company of Delaware, and Morris H. Alberger, Charles D. Middleton, E. C. Amer and F. H. Greene of Philadelphia, and the Overland Telephone Company of New York. The complainants aver that the defendants have infringed their rights in letters-patent to both telephone receivers and transmitter. They ask that the defendants be enjoined from using the inventions and that they be decreed to pay royalties for the time that they have had them in use.

OPERA BY WIRE.—From a recent issue of the Atlanta, Ga., *Constitution:* "A novel treat has been arranged for the telephone subscribers to take place to-night. Grau's English Opera Company will play 'Billee Taylor' at Birmingham to-night, and an arrangement has been made by which the Atlanta people will hear the opera. The opera-house at Birmingham will be supplied with a telephone which will be connected with the exchange. The exchange will be connected with the telegraph wire of the Georgia Pacific, which in turn at this end will be connected with the central telephone office in Atlanta. This connection of the two cities by telephone will be from 8 to 9 o'clock. Manager Jackson, of the Atlanta office, will do all in his power to give his long list of subscribers a fair chance at the music."

GROWTH AT MARION, IND.—The Marion Exchange was opened on August 12th, 1881, with seventeen subscribers, but has been ably built up by Mr. John A. Anderson, the present manager. Speaking of the work, the local *Democrat* says: To-day one hundred and eighteen separate and distinct wires centering in his large and elegantly appointed office in the south room of the Spencer Block, traverse every portion of our town on poles fifty feet in height. Not only does Marion transact a larger local telephone business than any other town or city in the State, with perhaps the single exception of Indianapolis, but an immense foreign business is also carried on daily. Not only has Mr. Anderson been thus successful with his telephone project, but he has so largely increased our telegraphic traffic that instead of two old-fashioned, inferior instruments, he now has in his office seven of the latest improved instruments in constant operation day and night.

TELEPHONE DIVIDENDS.—The October dividends of the several telephone companies under Lowell management have been mailed. There are 5,600 stockholders who receive this, and the amount divided aggregates $121,900. The last report of the Erie telephone company shows that it had 9,864 subscribers. The October report is due in about two weeks. The executive offices of the Lowell telephone business will, after Nov. 1, be located in the Mason building, on Kilby street, Boston. Starting from nothing four years ago, the Lowell telephone business has grown to immense proportions. Their books show 15,000 ledger accounts, their monthly expenses exceed $60,000, over 1,200 people being regularly employed, and, at the present rate of earnings, $500,000 are paid in dividends per annum. The entire business goes to Boston, and means the telephone business of Maine, New Hampshire, Vermont, Massachusetts (excepting Taunton and New Bedford districts), Minnesota, Dakota, Wisconsin in part, Texas and Arkansas; also Saratoga, Union and Washington counties in New York State.

COMMENTS ON CONSOLIDATION.—The consolidation of telephone exchange companies in New England with the American Bell telephone company has at last been effected, although one or two of the companies in the southern part of New England are not included. The stock of the new combination, watered by large stock dividends, is to be $12,000,000, and it will be observed that the new company is restricted in its operations by the survival of that section in the American Bell contract with the Western Union Telegraph Company that forbids the use of the telephone for transmitting "general business messages, market quotations, or news for sale or publication." In the hands of the new company, therefore, the telephone will continue to be used for local purposes, in small areas, and will not be developed for long-distance work. It may be that the American Bell company, alarmed by the energy and confidence of the supporters of Drawbaugh and McDonough, desires to enter the fight that may be close at hand with the advantages of an extensive "plant," and has for that reason come into the field of practical telephoning as a heavy stockholder in the most perfect system of "exchanges" now in existence.—*N. Y. Times.*

OPERATING RAILROADS BY TELEPHONE.—The Milwaukee *Sentinel* says: "The first railroad, so far as heard from, to adopt the telephone for the usual service required of the telegraph, is the new road just built by George Hiles from Remington to Vesper, through Wood County. By this method Mr. Hiles is enabled to operate his line without expert telegraph operators, and will make quite a saving in this direction. The line will cover about twenty miles of way." This may be the first case of the kind known to the *Sentinel*, but credit for priority in this respect, if there be any credit attached, is due to the Pittsburgh Southern Railroad, now a branch of the Baltimore & Ohio, which was operated by telephone for several years, up to the beginning of the present year, when the telephone service was abandoned and the telegraph adopted in its place. There are various reasons why the telephone is not as well adapted to train dispatching as the telegraph, and at least one serious accident on the Pittsburgh Southern, which we commented upon at the time, was attributed to the telephone. During the telegraph operators' strike last summer, the Philadelphia & Reading Railroad Company announced that it was prepared to substitute the telephone for the telegraph, in case its operators went out, but, fortunately for the company, it was not called upon to make the experiment.

THE ELECTRIC LIGHT.

BRUSH DIVIDEND.—The quarterly dividend declared by the Brush Co. last month was 1½ per cent.

FOR CABS AND OMNIBUSES.—The London *Telegraph* editorially discusses the possibilities of electric lighting for cabs and omnibuses, which it believes will be general in the near future.

BAY CITY, MICHIGAN.—The Jarvis Engineering Co., Boston, Mass., have received an order from the Thomson-Houston Electric Light Co. to ship two Armington & Sims Co. engines to Bay City, Mich.

NEW BEDFORD, MASS.—Forty subscribers have been secured by the New Bedford Electric Light Company, with lights to the full capacity of the machinery. Applicants off the line of wires now strung have been refused.

HAVERFORD COLLEGE, PA.—At the semi-centennial celebration of the founding of Haverford College, Pa the leading educational establishment of the Society of Friends, the speaking at night was done under the electric light.

MADISON AVENUE BRIDGE.—The bridge that is to connect New York with Westchester, by way of Madison avenue, nears completion, and may open with the new year. On top of it will be a very powerful electric light for guiding the vessels that use the river at night. The current for this light will be generated by a dynamo-electric machine situated in the structure on the bridge.

THE ELECTRIC LIGHT IS BAD FOR DUCKS.—A flock of wild ducks passed over the city last night en route from Canada to the South. A large number of them flew against the electric light mast at the corner of St. Clair and Erie streets, and were killed. Patrolman Corrigan picked up three fat ones, and said that he heard several more of the injured birds flopping about on the roof of the medical college.—*Cleveland Leader, October* 23.

SAVANNAH IN DARKNESS AND ASHES.—The city of Savannah, Ga., was devastated by a terrible fire on the night of the 31st ult. Three hundred houses and other buildings were destroyed, with other property, and 1,500 people were rendered homeless. The total loss is put at one million dollars. The electric light works were among the property destroyed, and the city is consequently in total darkness.

THE VARLEY PATENT CARBON CANDLE.—This carbon is recommended in English journals for its cheapness in electric lighting. The figures are in effect 3 cents an hour for one-horse power dynamo, including depreciation, cost and running for 2,500 hours per year. The gas is put at 2 cents, and the attendance the same, making a total cost per hour for fifty 100 candle-power arc lights 8 cents. In order to get the same amount of illumination by gas it is estimated that 2,500 cubic feet would be required, which at 75 cents a thousand amounts to $1.88.

RUMOR OF AN EXTRA DIVIDEND.—It is rumored that an extra quarterly dividend of 1½ or 2 per cent. on both the common and preferred stock of the American Electric and Illuminating Company will be paid December 1. The preferred stock is entitled to 4 per cent. semi-annual on the 1st of March and the 1st of September of each year, and all dividends beyond that figure apply alike to both classes of stock. Last March the regular 4 per cent. was paid on the preferred; in September the regular 4 per cent. on the preferred and an extra dividend of 2 per cent. on both classes.

THE BRUSH-SWAN SYSTEM.—A committee of business men of Bridgeport, Conn., appointed to examine and report upon the efficiency of the Brush-Swan incandescent light and storage battery system in use at the Willimantic linen mills has made a report, urging the establishment of a central station with a capacity of eighty arc and

fourteen hundred incandescent lights, using the above-named system. Subscription books will be opened in a few days. Negotiations are also pending looking toward the establishment of a Brush-Swan system of incandescent lighting in New Haven.

FALL RIVER, MASS.—Work on the central station of the Edison Electric Illuminating Company, at Fall River, is rapidly progressing. The company has leased a Thomson-Houston arc light from the Fall River Electric Light Co. and will continue the work night and day. Mr. Edison is expected to arrive within the next fortnight to superintend the work in person. The wires in the Flint Mill are nearly all up, and when the light is in working order the work of setting up the machinery will be continued during the nights. It is expected that the central part of Main street, Fall River, will soon be lighted by the arc light.

PROVIDENCE, R. I.—The movement to introduce the American Electric and Illuminating system of electric lighting in Providence, R. I., was defeated by the board of aldermen of that city by a vote of 8 to 2. After a long discussion they refused to allow the company to run its wires through the city streets. Up to this time the only American lights in Providence have been those on exhibition in the company's station, no wire having been run outside of the building. The main objection to allowing the company to do business in Providence, it is stated, arose from the fact that its charter does not make the stockholders personally liable.

WHY THE LIGHTS WENT OUT.—Last week we gave the reason why some of the Edison lights went out during the heavy storm that prevailed. The Philadelphia *Times* now reports Mr. Hoskins, the agent in that city of the Edison Electric Light Company, as saying: "Our work is as yet largely experimental, but we are constantly learning by experience. Just as a gas company has to enlarge its supply mains as a neighborhood grows, so we must insert safety catches capable of greater resistance as the consumption increases. The New York accident has taught us that we must use larger safety catches and run the risk of heating the wires slightly."

JOLIET, ILL.—About a month ago a paragraph went the rounds as to an electric light war at Joliet, Ill., where, it was said, the Fuller and Van Depoele companies were underbidding each other in a ruinous way. We now learn that there was no foundation for the story other than that of the natural competition that must exist between electric light companies. The Van Depoele company say, in their own behalf, that the assertion that they furnish their lights without compensation is an absurdity. They sell their apparatus precisely as any other piece of merchandise is sold; they desire to make a profit on it, and would not dispose of it on any other terms.

ON THE RIVER STEAMERS.—There is a growing demand for the electric light on the river steamers of the West and South. Some boats use a single light only in making landings, while others light the cabins and decks throughout. The steamer James Lee of Memphis, Tenn., has fitted up with the Maxim incandescent light, the power for which is furnished by a Westinghouse engine of 20 horse power. A similar plant is on the Will S. Hays, of Louisville, Ky. The Westinghouse Machine Company report a large number of recent orders for smaller engines to run single lights, some of them to go on the Alabama and Tombigbee rivers.

THE EDISON COMPANY IN PENNSYLVANIA.—The Edison electric light is meeting with much success in the smaller Pennsylvania towns. At Hazelton, last week, a stock company was organized for the purpose of introducing the light into the town. The stock has all been taken, amounting to $25,000. A board of directors has been elected and an application made for a charter. It is hoped that by the first of January the company will be in successful working order. At Mount Carmel an Edison electric light company has been organized: Messrs. William Schwenk, Thomas M. Righter, A. M. Montelius, George Robertson, E. C. Tier, Joseph Gould, and M. K. Watkins were elected directors. Three hundred and twenty shares were sold within twenty-four hours, each share costing $50. A site has been selected for the engine house and other buildings. A plant for 800 burners will be in readiness about Christmas.

NEW HAVEN, Conn.—The Connecticut Electric Lighting Company, which was organized and began operations in this city some two years since, and which in September last suspended operations, has sold its entire plant, consisting of a Harris-Corliss engine of two hundred horse power, twenty large Weston dynamos, lamps and other apparatus, to Mr. Herrick P. Frost, a stockholder in the company, for $53,000. Mr. Frost claims that the purchase is an individual one and in no way connected with the old organization. It is thought that he will go into the electric lighting business on his own account.

The New Haven Electric Company, using the Thomson-Houston system, has been organized with a capital of $50,000. The company will commence furnishing the light about November 15, with one hundred and fifty lights in circuit. Mr. J. Murray Fairchild will be the company's electrician.

LIGHTING HELL GATE.—Last week we gave some particulars as to the light to be established at Hell Gate, on Hallett's Point. We learn that the foundations of the electric light tower have been finished some five weeks. They are five in number, built of concrete on the solid rock, and in height are about four feet above the level of tide-water mark. They are arranged—four of them—in the shape of a parallelogram, with another support in the centre. Those supporting the corners of the tower are eight feet square and about forty feet apart on one side, and sixty feet on the other. The centre support is five feet square. The structure will jut out from the shore, one corner of it being at the extreme angle or corner made by the sharp trend of the land. The light will be in intensity equal to the power of 5,000 candles. The whole structure will be 250 feet high, cost $20,000, and be completed, it is thought, before snow flies.

MISCELLANEOUS NOTES.

JAY GOULD was once a poor farmer's lad, and this country would probably have better luck if he had remained so.—*Ex.*

BOSTON'S "FINEST."—The R. I. Telephone & Electric Co. advertise a "lightning arrester." Seems as if that would be a good thing for the Boston police force.—*Com. Bulletin.*

THE RECIPE WANTED.—Referring to an item in the St. Paul *Pioneer-Press*, stating that "a woman at St. Cloud has had her husband struck by lightning," a paragrapher says that many wives would like to get the recipe from her.

AN IMPORTANT CONTRACT.—The Union Switch and Signal Company, in Pittsburgh, has the contract for supplying the New York, West Shore & Buffalo Road with a complete system of block signals. The system will be extended over the whole line of the road.

MR. A. G. DAVIS' FACTORY BURNED.—We regret to learn by a dispatch from Baltimore, that the factory of Mr. A. G. Davis, at the Relay House, B. & O. R. R., near that city, was burned on the night of Friday, Oct. 26. The loss is stated at $30,000, and the insurance $20,000. Mr. Davis had a splendid factory at the Relay House and was getting into position to do a nice business. We hope the fire will inconvenience him but little, and that he will lose nothing through it. He is a man of too much vim and pluck to let a fire or anything else keep him down very long.

THE WICACO SCREW AND MACHINE WORKS, 712 Cherry street, Philadelphia, issue a highly interesting pamphlet relative to uniformity of screw threads and bolts, and referring to their own improved method of making screws by machinery. The information collected is valuable to a marked degree, and all our readers employed practically should have the pamphlet handy. Attention is called to the Parham Turret Screw Machine, specially adapted to the manufacture of all kinds of electric machinery and fittings.

UNITED STATES CABLE COMPANY.—John H. Kitchen, as receiver of the stock and property of the United States Cable Company, he having been appointed in proceedings brought for a voluntary dissolution of the company, presented a petition to Judge Barrett, in Supreme Court Chambers, on the 31st ult., for leave to sue J. J. Slocum. Mr. Kitchen says that Slocum, while treasurer of the company, wrongfully and without the authority of the company paid out funds to the amount of $10,000. He says that Slocum was at the time, and still is, confidential clerk in the employ of Russell Sage; that the latter received the check for $10,000, indorsed by E. Biederman, and deposited the check in the bank to his own credit. The application for leave to sue was granted.

A GREAT INVENTION.—A cable dispatch announces that Solomon Schisgal, a youth of St. Petersburg, has invented an electric watch having two wheels and no springs. At first thought this seems to be a singular matter to form the subject of a cable dispatch, but when we reflect how long we have been tyrannized over by watchsmiths, and how often we have been obliged to accept with blind faith, but with inward misgivings, their statements that our watches required new springs or jewels, of one kind or another, the importance of M. Schisgal's discovery becomes more apparent, and the sagacity of the cable man is justified. A watch with two wheels and no springs will certainly be a sweet boon to mankind, if it does not require its possessor to carry around with him a galvanic or storage battery, needing frequent renewals.

AN AUSTRIAN RAILROAD.—The project of a high-level railway for the city of Vienna has failed, says the Pall Mall *Budget*, because the capital could not be raised, and the Austrian government has now granted Messrs. Siemens and Halske a concession for the preparatory works for a net of electric railway lines, by which communication in the city would be greatly facilitated. The contractors will have three distinct periods wherein to build the railways. The first will comprise the completion of a line from the central town to the Danube Canal, and several suburbs through which no tramways go at present. The same firm, some time ago, opened a small line of electric railway to the electric exhibition, which was so great a success as to induce two syndicates of banks—the one represented by the Landerbank, the other by the Vienna Banking Union—to offer to find the necessary capital for the new undertaking, namely, 40,000,000 to 50,000,000 florins.

INCREASE OF ELECTRIC TIME SERVICE.—The Rhode Island Telephone and Electric Company, says the Providence *Journal*, is rapidly justifying the anticipations of its founders. Not content with inspiring a complete renaissance in lightning-rod construction, and in infusing a new spirit into electric work in general, it has by a courageous, and apparently well conceived movement, reached out and annexed, for the purpose of its business, the entire territory of New England. Negotiations have been concluded which give to the company the sole right to introduce the new electric time service throughout the Eastern States, with the exception of a few towns in Connecticut. The officials of the company regard the franchise as a most valuable one; experience having not only proved the excellence of the invention, but shown that the public generally appreciate it. Orders are already entered here for several hundred clocks, and are coming in at the rate of twenty to thirty a day. With the introduction of this system, and the new method of reckoning time devised by the Railroad Convention, a needed revolution in time computation is accomplished.

UNDERGROUND TELEGRAPH WIRES.—The Ceneral Committee on Underground Communication, whose object is to find a system by which the telegraph and other electric wires can be placed underground, has been at work all summer. It has been examining devices, looking up the question of franchise and law points, and also how the business organization can be effected. The problem has been most complex and difficult, but the Special Committee on Devices, to whom this branch of the subject was referred, believes that it has found a system, or rather parts of several systems, that may be combined so as to give a satisfactory solution of the problem. Over 500 devices, from nearly every civilized country, have been examined by the committee. Nearly every day has brought forth some devices or inventions. As soon as this committee reports, which will occur before long, the Committee on Law and Franchises and Business Organization will make ready their reports. The committee is made up of prominent officers in nearly every telegraph and telephone company in the city. The Western Union was formerly represented by Vice-President Bates and others, but on Dr. Green's departure for Europe, they withdrew from the committee.

LOUIS BREGUET.—The cable announces the death of Louis Breguet, of the French Academy of Sciences, and the head of a great house of instrument makers. He was a grandson of Abraham Breguet, of the Academy of Sciences, the founder of that house, and was born at Paris, December 22, 1808. On the death of his grandfather in 1823, he went to Switzerland for three years to learn watchmaking, and in 1826 was made by his father director of his manufactory of marine chronometers. In 1833 he succeeded to the business on his father's withdrawal, directed his attention to the physical sciences, and under the auspices of the illustrious astronomer, Francois Arago, made important practical experiments in electric telegraphy, which, in the opinion of his countrymen, entitled him to rank with Wheatstone and Morse among the inventors of that art. He devised a signal telegraph, employed for some time in France, the signals being almost the same as those subsequently adopted by Morse for his magnetic telegraph. In 1845 he published the first formal "Treatise on Telegraphy," for which he was decorated with the Legion of Honor, and was promoted to officer in October, 1878. He made several important inventions in chronometrical appliances, gained four medals for the splendid chronometers manufactured by his firm, was chosen a member of the Bureau of Longitudes in March, 1862, and member at large of the Academy of Sciences, March 30, 1874, in place of Antoine Passy.

STOCK QUOTATIONS.—Telegraph, telephone and electric light stocks were quoted on Friday of last week and Thursday of this week as follows:

	Oct. 26.	Nov. 1.
American Cable	62½	61½
Western Union Telegraph	79⅝	78¾
Bankers and Merchants' Tel.	135¼	135⅝
Commercial Telegram	....	90
Gold and Stock Telegraph	....	88
Mutual Union Telegraph	16½	....
American District Telegraph	16	16
Postal Telegraph	45	....
American Bell Telephone	209	205
Union Telephone	.. .	90
Bay State Telephone	104	98
Globe Telephone	40	....
Long Island and New Jersey Telephone	90	....
Tropical Telephone	....	1¼
Mexican Telephone Co.	2⅛	2¼
National Bell Telephone of Maine	69	67
New York and Pennsylvania	88	90
Boston & Northern Telephone	90	100
Peoples' Telephone	....	6½
Suburban	100	98
Erie Telephone	50	48
Granite State Telephone	85	....
New York and New Jersey	94	85
Brush Electric Light	90	....
Edison Electric Illuminating	80	70
Edison Electric Light	....	150
U. S. Electric Lighting	117	...

THE "ELECTRICAL WORLD'S"
ILLUSTRATED RECORD OF ELECTRICAL PATENTS.

ALL THE PATENTS MENTIONED BELOW ARE DATED OCT. 23, 1883.

Automatic electric cut-out; Chas. G. Perkins, of New York City, assignor to the Imperial Electric Light Company, of same place..... 287,320

This invention consists of a strip of sheet metal or wire *K* such as is commonly employed in electric cut-outs, bent twice at right angles and mounted lengthwise on a cylinder *C* made of insulating material. The cylinder is held between two binding posts by

Fig. 1.

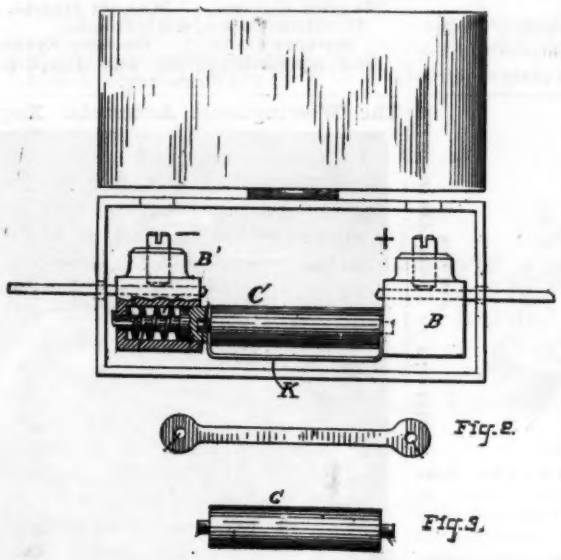


Fig. 2.

Fig. 3.

a spring bolt placed in a cavity in one of them. The spring maintains the electrical connection between the binding posts *B B'* and the strip *K*, and it also permits of the ready renewal of the latter after it has been destroyed by an excessive current. Fig. 1 shows the cut-out inclosed in its case. Fig. 2 shows the strip and Fig. 3 the insulating cylinder.

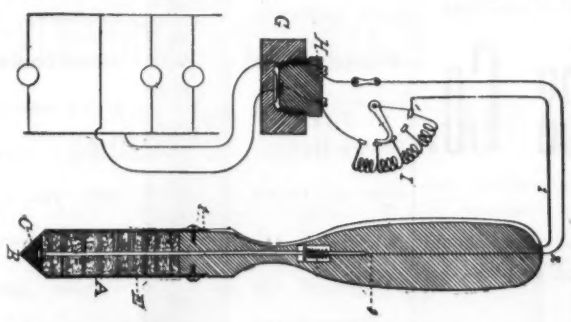
Automatic switch and cut-out; Chas. G. Perkins, of New York City, assignor to the Imperial Electric Light Company of same place..... 287,321

This is a safety catch and cut-out designed to be placed in the main circuit between the generator and the lamps. Its office is to cut the lamps out should the current be greater than the lamps could utilize. It is operated by an electro-magnet in the main circuit.

Carbon-holder for incandescent lamps; Chas. G. Perkins, of New York City, assignor to the Imperial Electric Light Company of same place..... 287,323

In this lamp several carbon filaments are held by one end in a central metallic cup, while the other ends are held in separate cups. A carbon paste is employed to secure the ends of the filaments in these cups.

Electrical soldering-iron; Charles T. Hughes, of Menlo Park, N. J..... 287,380



This electric soldering-iron is adapted to the multiple arc system of lighting by incandescence and may be placed in circuit in place of one of the lamps. The metallic head *A* has a hollow point *B* containing material *C*, of high resistance, above which is placed a quantity of non-heat-conducting material *E*. The current passes from the plug *H* inserted in lamp socket *G* through the conductor, through the adjustable resistance *I* to the head *A*, thence through the material *C*, thence by the conductor *I* back to the plug *H*.

Electrode for electric-arc lamps; C. J. Van Depole, Chicago, Ill..... 287,344

This electrode is made in the form of a tube, with thick walls, and is filled with ashes. The inventor says that this form of electrode will not hiss, and will keep the light more central than the ordinary solid carbon.

Electric switch and cut-out; Charles G. Perkins, New York City, assignor to the Imperial Electric Light Company, of same place..... 287,322

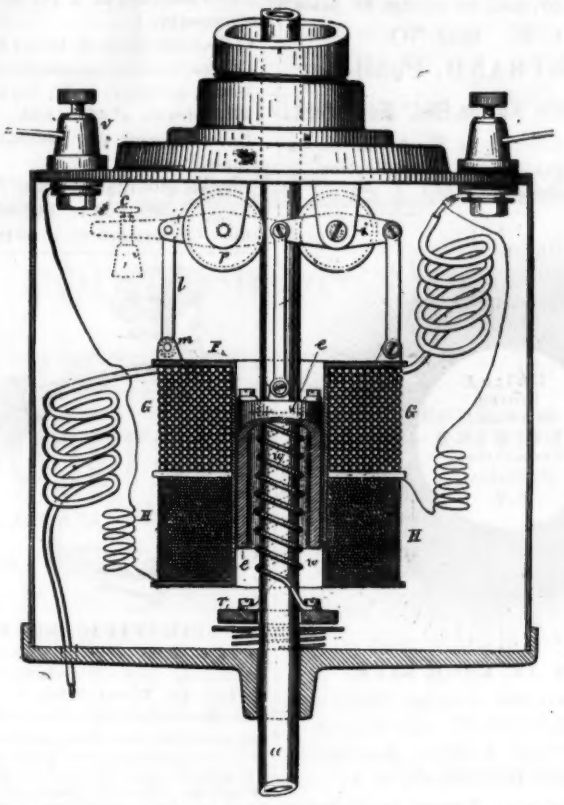
This cut-out is provided with a fusible wire, which melts under an excessive current. It is also furnished with mechanism to be operated by hand.

Electric incandescent lamp and holder; Chas. G. Perkins, of New York City, assignor to the Imperial Electric Light Co., of same place...287,313, 287,314, 287,319

These patents relate to the details of the lamp, its holder and the switch in the lamp socket.

Electric-arc lamp; J. B. Tibbits, Hoosic, N. Y..... 287,067

In this lamp the helix employed forms a counterpoise to the carbon-holder, the parts being connected by levers and links so as to oppose and counterbalance each other. The current passing through the two helices *G H* moves the core *e* up or down, the direction of the movement depending upon the strength of the current. When the magnetism in the helix *G* preponderates, the core *e* is drawn up and helix is drawn down, bringing the clutch into engagement with the carbon-holder and lifting it. When the magnetism in the fine wire or shunt helix *H* predominates, the core and helices move in the opposite direction, the clutch is released and the carbon feeds. The clutch *w* is composed of two wire spirals surrounding the carbon-holder and attached at their upper ends to the core *e*, their lower ends being secured to an annular weight *r* surrounding the carbon-holder. The elongation of these spirals by the upward movement of the core *e* diminishes their diameter, bringing them



into engagement with the carbon-holder. Shortening the spirals by the downward movement of the core produces the opposite effect.

Electric-wire insulator; J. F. Martin, Chicago, Ill..... 287,146

The walls of this insulator are provided with series of perforations filled with non-conducting material.

Electric transmitter; S. D. Field, N. Y. City, assignor to the Commercial Telegram Co., of same place..... 287,267

This transmitter reverses or changes the polarity of the current thrown upon the line, and when inactive throws on the line a current a definite percentage of the maximum current.

Electric conductor; F. Jacob, of Woolwich, county of Kent, assignor to Siemens Brothers & Company (Limited), of Westminster, England..... 287,288

This invention relates to a system of double circuits, in which either a metallic circuit or a circuit with grounds may be employed.

Electric switch-board and signaling apparatus; T. W. Lane, of Boston, assignor to Chas. Williams, Jr., of Somerville, Mass..... 287,300

This invention provides an additional metallic strip on the switch-board connected with the generator and ground, and a contact spring on the plug adapted to make contact with the strip when the spring of the plug is moved to cut off the ground connection, and temporarily open or break the listening circuit. This improvement enables the operator to accomplish with one hand results formerly requiring the use of both hands.

Gutter, curbstone and sidewalk conduit for electric wires; Edward Clark, of Cornwall, N. Y..... 287,237

The object of this invention is to obtain space for electric wires without interfering with lamp-posts, hydrants, with holes and sidewalk vaults.

Lightning-rod joint; Wm. Hewitt, London, Ontario, Canada..... 287,286

This is a simple and secure fastening for flanged lightning rods. It consists mainly in the device for adapting a rod with a cross-shaped section to threaded thimble coupling.

Mechanism for preventing induced currents in telephone lines; J. W. Brennan and N. Rousseau,, of Chicago, Ill..... 287,092.

This invention consists mainly in a conducting body arranged at suitable intervals in close proximity to the telephone line, but insulated therefrom and provided with a ground connection.

Metallic insulating covering for telegraph wires; Edward Clarke, of Cornwall, N. Y..... 287,236

The wires are covered with a coating of copper, and this coating is covered with an alloy of copper, and Babbitt metal. A coating of lead is then applied, then a coating of rubber, and finally the whole is inclosed in a metallic tube.

Printing telegraph and transmitter therefor; S. D. Field, of New York City, assignor to the Commercial Telegram Co., of same place..... 287,265

This invention relates to a novel method of effecting two operations, one by what the inventor calls "whole impulses," the other by "semi-impulses," and to means for utilizing such impulses for securing different results.

Printing telegraph; S. D. Field, of New York City, assignor to the Commercial Telegram Co., of same place..... 287,266

In this apparatus the unison stop is placed on a wheel receiving motion from the type-wheel shaft, and revolving only once while the type-wheel revolves several times.

Regulator for dynamo-electric machines; C. J. Van Depoele, of Chicago, Ill..... 287,343

The field magnet is wound with a number of separate helices of equal resistance, arranged to be successively connected in multiple-arc and forming a divided circuit normally closed upon the armature. Means are provided for automatically throwing a greater or less number of its coils into or out of the circuit, thus energizing the field magnet to a greater or less degree.

System of generating and distributing electric currents; Charles J. Van Depoele, of Chicago, Ill..... 287,347

This improvement enables consumers to cut out their lights or motors and at the same time cause the dynamos to produce the necessary amount of current and no more, thus saving the cost of motive power.

Safety switch for dynamo-electric machines; C. J. Van Depoele, Chicago, Ill..... 287,345

This is an automatic circuit breaker operated by an electro-magnet in the main circuit and breaking the current between the coils of the field magnet and the exciter when the main circuit is broken or interrupted.

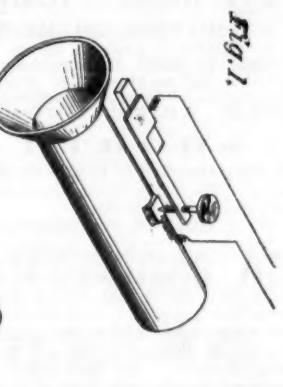
System of electric lighting; John A. McCoy, Fall River, Mass..... 287,040

This invention consists in the combination with a generator, main conductors, and one or more intermediate conductors, of translating devices connected in multiple series, with conductors and circuits of variable resistance, connecting the conductors together.

Sound transmitting apparatus; J. H. Rogers, New York City, assignor to American Electro-Gas Telephone Company of New Jersey..... 287,169

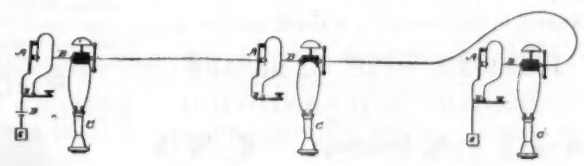
Fig. 2.

Fig. 1.



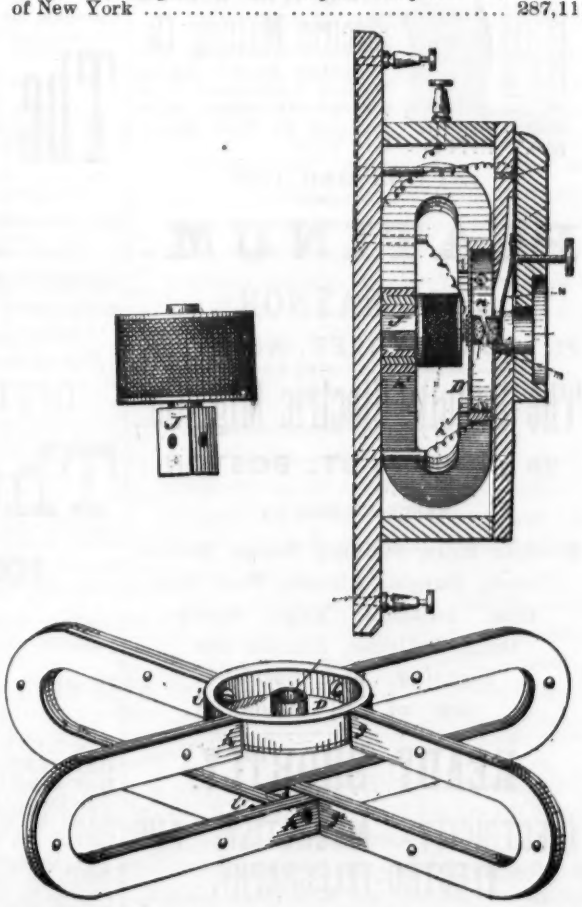
This invention consists in a speaking telephone made by mounting one or both of the tension-changing electrodes upon a tube or pipe of any convenient length, and so constructed that the mouth may be applied to it and the tube used after the manner of the speaking tube. Two forms of this instrument are shown in the engraving. The inventor shows several in his patent.

Telephone system; G. L. Anders, of Boston, Mass., assignor to the American Bell Telephone Co., of same place..... 287,356



In this telephone system the receiving telephone *C* is placed in a local circuit connected with the main line through the intermediary of an induction coil *B*. The transmitter *A* is in the main line charged with the battery *D*. Keys *E'* at the stations for short circuiting or shunting the transmitters.

Telephone repeater; Daniel Drawbaugh, of Eberly's Mills, Pa., assignor to the People's Telephone Co. of New York..... 287,111



This repeater has its diaphragm *D*, and core *J*, strongly magnetized by the arrangement of *U*-magnets, shown in Fig. 1. The diaphragm carries one of the repeater second-circuit electrodes and a spring *N* carries the other, as clearly represented in Fig. 2.

The circuit to which the speech is repeated is affected by the vibration of the diaphragm *D* in the same manner as it would be were the diaphragm directly affected by vocal sounds.

Telephone support; T. W. Lane, of Boston, assignor to Chas. Williams, Jr., of Somerville, Mass..... 287,301

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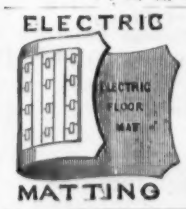

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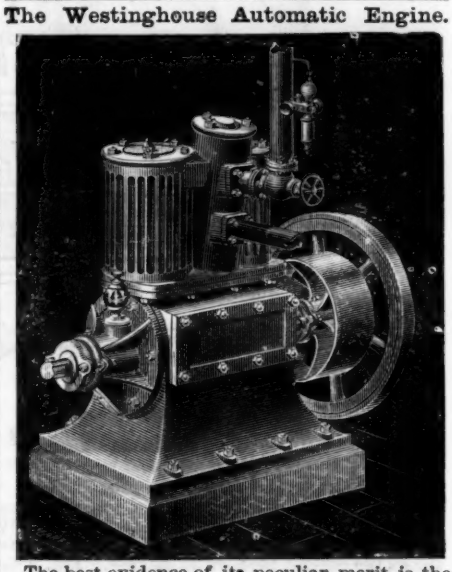

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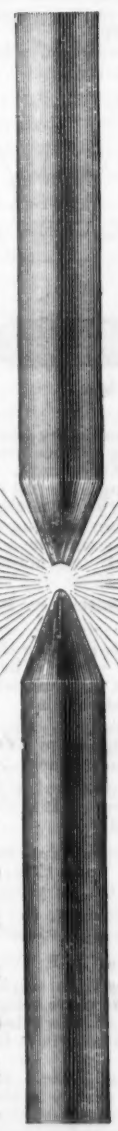

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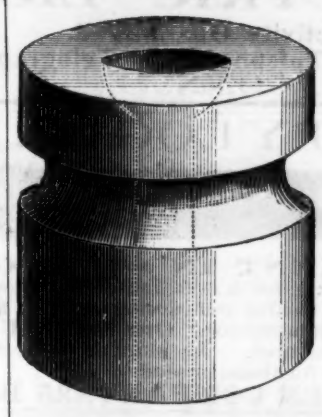

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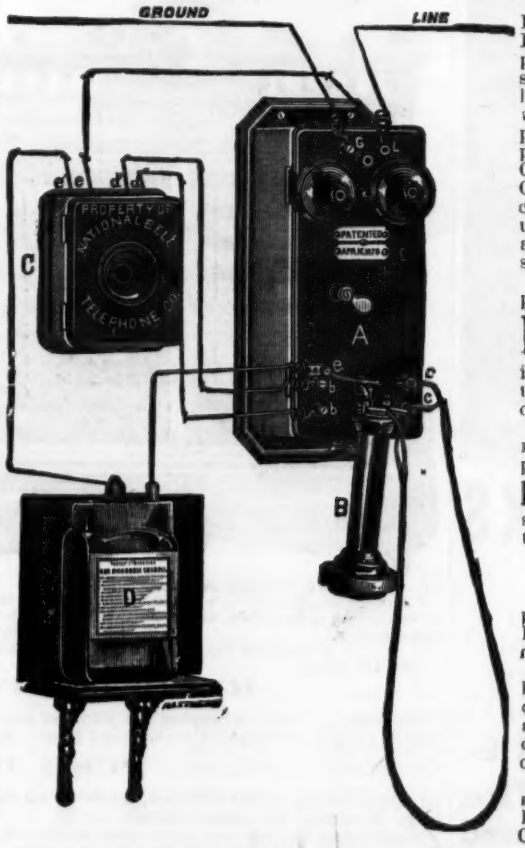

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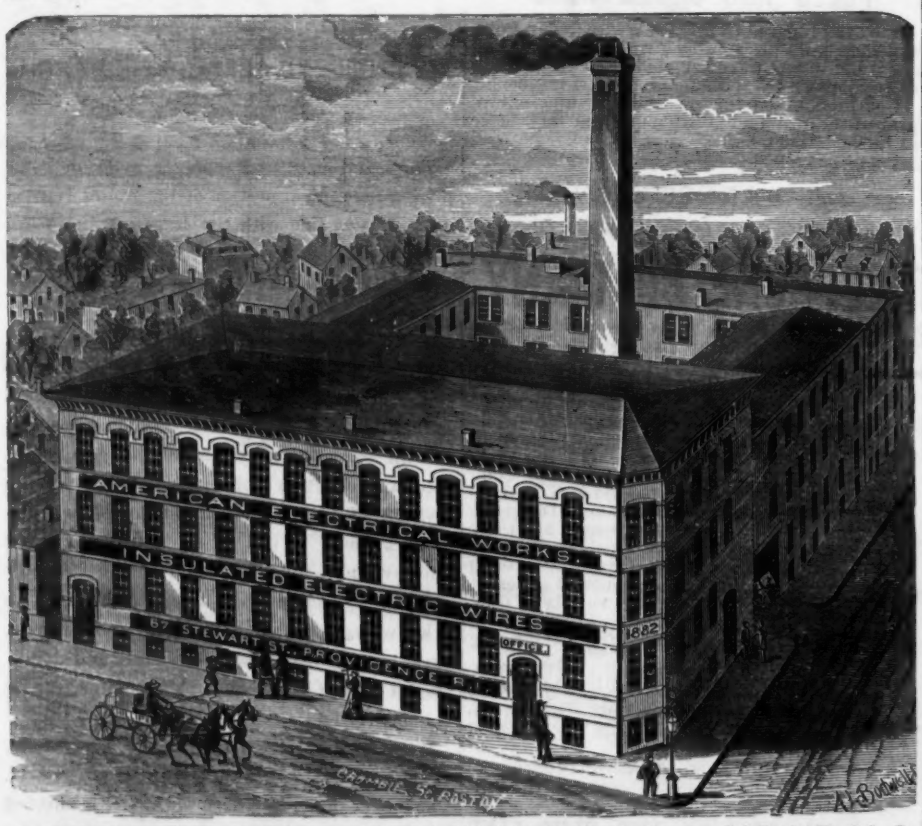

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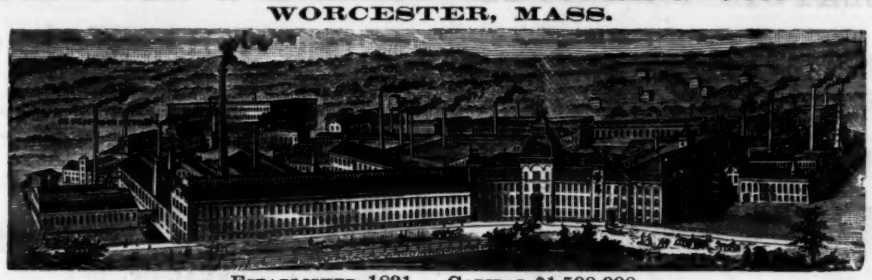

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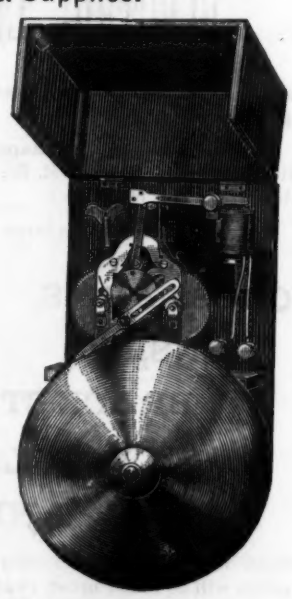

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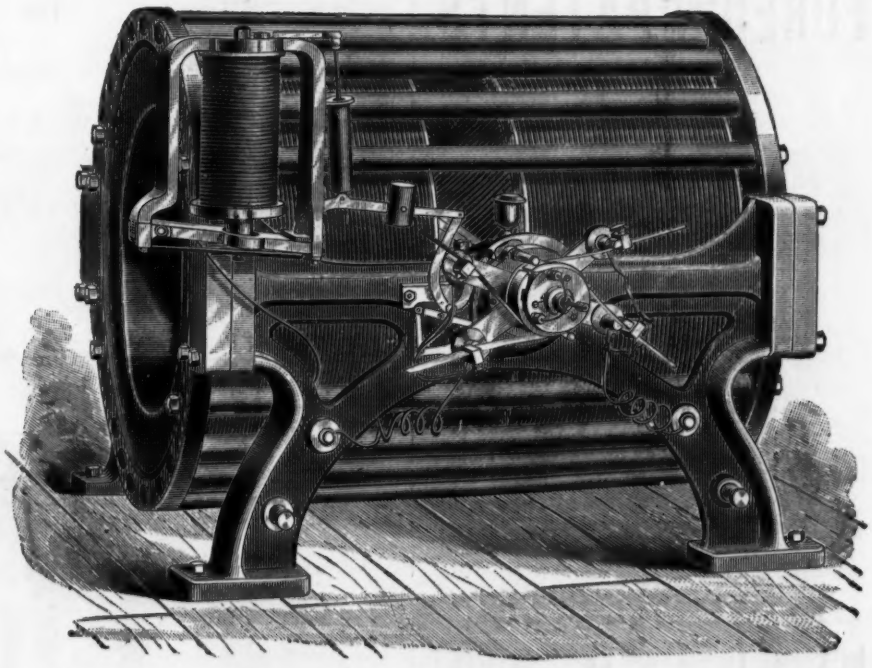

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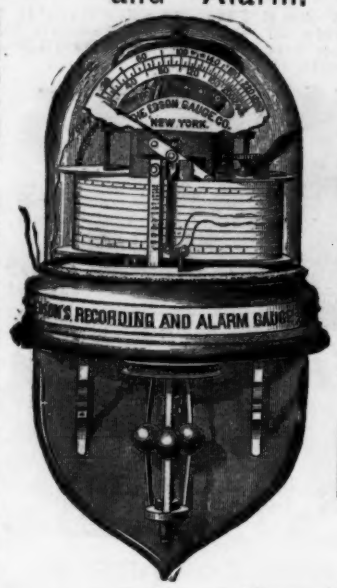

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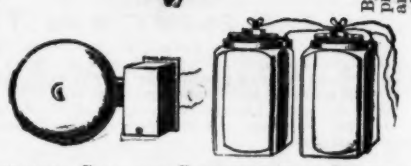

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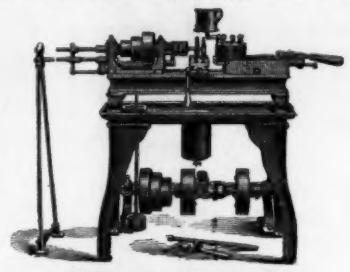

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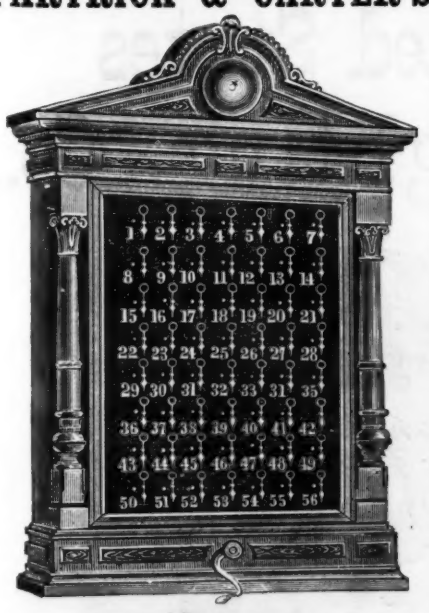

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4th. It is very simple in construction, easy of manipulation and rapid and reliable in action, the instruments being *automatically* maintained in unison.

5th. It is operated without clock-work—by impulses direct from the generator at the Exchange, and is under exclusive control of the operator.

6th. It relieves the subscriber of any duty but to answer his calls, and renders it impossible for him to interfere with others through ignorance or neglect.

7th. It is exclusively a magneto call, requiring no battery, and combines, in a very handsome box but little larger than the ordinary magneto bell, the individualizing apparatus, local generator for calling Exchange, bell and telephone switch.

8th. It works equally well over long or short lines (from short circuit to 2,000 ohms), and no change of adjustment in the bells is required when additional ones are looped into a circuit already established.

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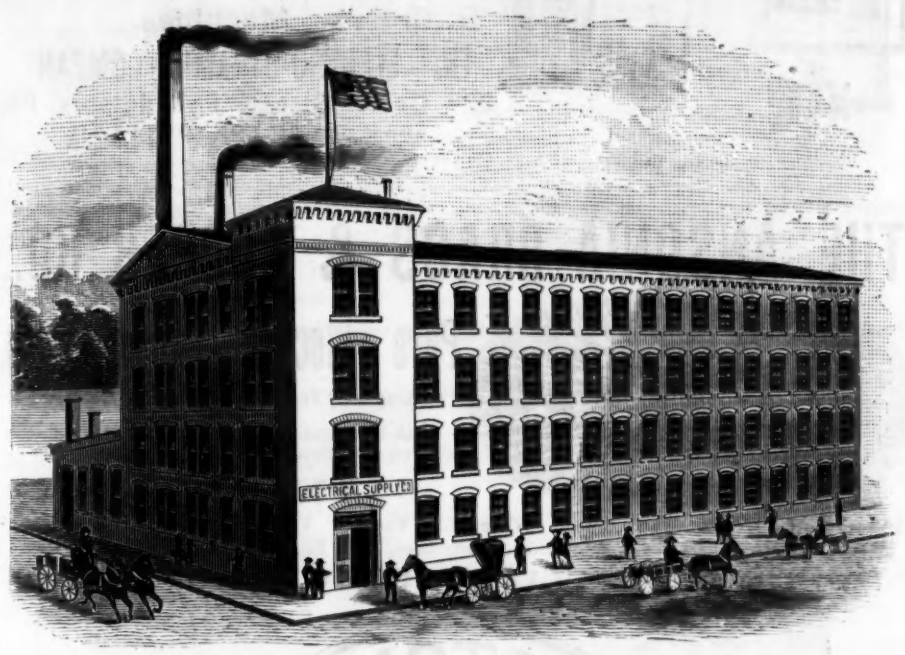

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This Battery, as perfected and improved, is Unequaled for Telephone or Bell Work.

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Jar, 6 inches High, 4 inches Square. Fits any Telephone Box

PATENTS ALLOWED, AUG. 1, 1883.

Least Internal Resistance.

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PRICE, COMPLETE, $1.25.

PRICE OF PARTS:

Jar only	each 15 cents.	Plain Zincs	10 cents
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Discount—Per case, 10 per cent.; for 10 cases, 20 per cent; for 25 cases, 30 per cent.

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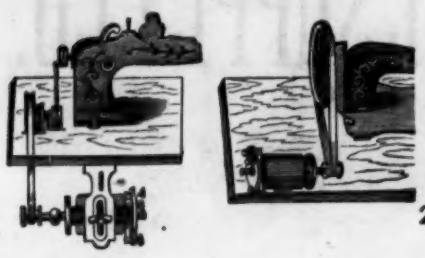

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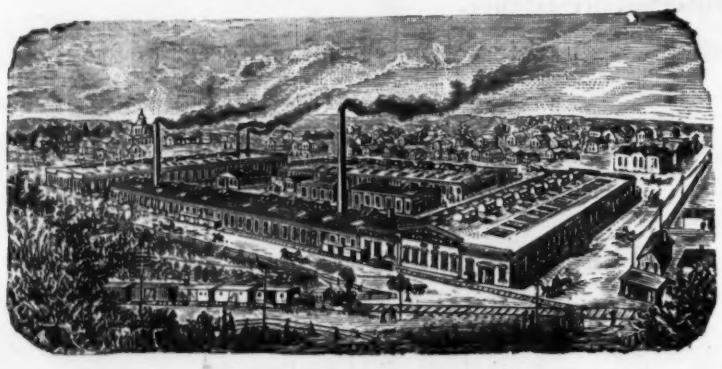

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Number of Machine.	Number of Arc Lights.	Nominal Candle Power.	Horse-Power required.
5	10	1,200	6
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To fill the large orders which have accumulated on our books. We desire to state that these batteries ar

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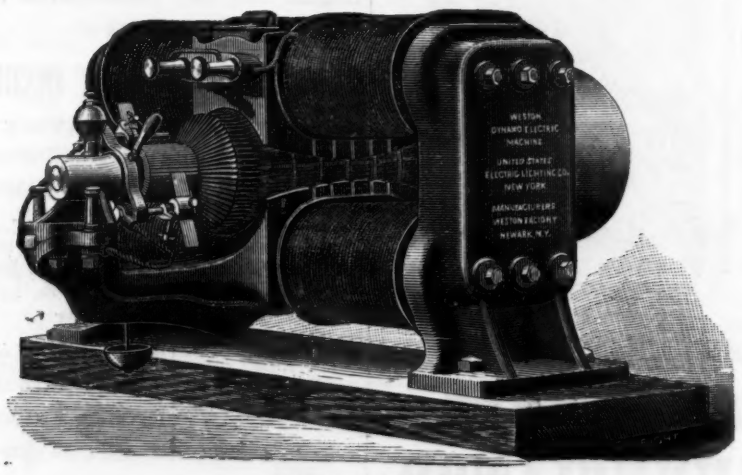
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